SANYO

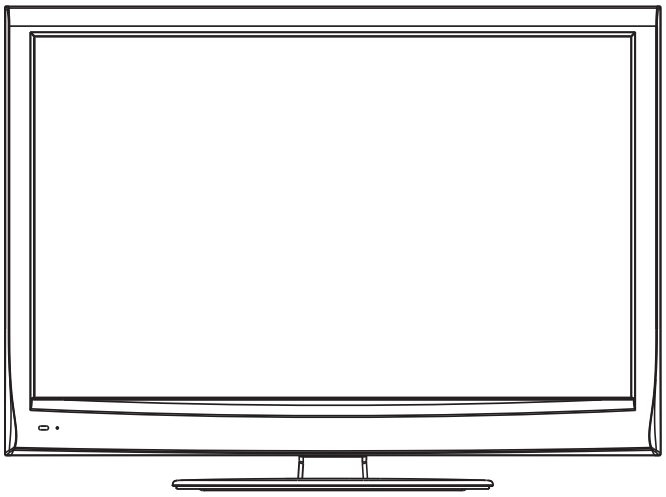
FILE NO.

SERVICE MANUAL

LCD TV

LCD-40XR10F(D)

PRODUCT CODE No.
1 682 351 22: PAL-BG(TV) DTV



REFERENCE No.:SM0915180

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Attention: This service manual is only for service personnel to take reference with. Before servicing please read the following points carefully.

Safety precautions

1. Instructions

Be sure to switch off the power supply before replacing or welding any components or inserting/plugging in connection wire Anti static measures to be taken (throughout the entire production process!):

a) Do not touch here and there by hand at will;

b) Be sure to use anti static electric iron;

c) It's a must for the welder to wear anti static gloves.

Please refer to the detailed list before replacing components that have special safety requirements. Do not change the specs and type at will.

2. Points for attention in servicing of LCD

2.1 Screens are different from one model to another and therefore not interchangeable. Be sure to use the screen of the original model for replacement.

2.2 The operation voltage of LCD screen is 700-825V. Be sure to take proper measures in protecting yourself and the machine when testing the system in the course of normal operation or right after the power is switched off. Please do not touch the circuit or the metal part of the module that is in operation mode. Relevant operation is possible only one minute after the power is switched off.

2.3 Do not use any adapter that is not identical with the TV set. Otherwise it will cause fire or damage to the set.

2.4 Never operate the set or do any installation work in bad environment such as wet bathroom, laundry, kitchen, or nearby fire source, heating equipment and devices or exposure to sunlight etc. Otherwise bad effect will result.

2.5 If any foreign substance such as water, liquid, metal slices or other matters happens to fall into the module, be sure to cut the power off immediately and do not move anything on the module lest it should cause fire or electric shock due to contact with the high voltage or short circuit.

2.6 Should there be smoke, abnormal smell or sound from the module, please shut the power off at once. Likewise, if the screen is not working after the power is on or in the course of operation, the power must be cut off immediately and no more operation is allowed under the same condition.

2.7 Do not pull out or plug in the connection wire when the module is in operation or just after the power is off because in this case relatively high voltage still remains in the capacitor of the driving circuit. Please wait at least one minute before the pulling out or plugging in the connection wire.

2.8 When operating or installing LCD please don't subject the LCD components to bending, twisting or extrusion, collision lest mishap should result.

2.9 As most of the circuitry in LCD TV set is composed of CMOS integrated circuits, it's necessary to pay attention to anti statics. Before servicing LCD TV make sure to take anti static measure and ensure full grounding for all the parts that have to be grounded.

2.10 There are lots of connection wires between parts behind the LCD screen. When servicing or moving the set please take care not to touch or scratch them. Once they are damaged the screen

would be unable to work and no way to get it repaired.
If the connection wires, connections or components fixed by the thermotropic glue need to disengage when service, please soak the thermotropic glue into the alcohol and then pull them out in case of dagmage.
2.11 Special care must be taken in transporting or handling it. Exquisite shock vibration may lead to breakage of screen glass or damage to driving circuit. Therefore it must be packed in a strong case before the transportation or handling.
2.12 For the storage make sure to put it in a place where the environment can be controlled so as to prevent the temperature and humidity from exceeding the limits as specified in the manual. For prolonged storage, it is necessary to house it in an anti-moisture bag and put them altogether in one place. The ambient conditions are tabulated as follows:

Temperature	Scope for operation	5 ~ +35 ^{o}C
	Scope for storage	-15~ +45 ^{o}C
Humidity	Scope for operation	20% ~ 80%
	Scope for storage	<= 80%

2.13 Display of a fixed picture for a long time may result in appearance of picture residue on the screen, as commonly called “ghost shadow”. The extent of the residual picture varies with the maker of LCD screen. This phenomenon doesn’t represent failure. This “ghost shadow” may remain in the picture for a period of time (several minutes). But when operating it please avoid displaying still picture in high brightness for a long time.

3. Points for attention during installation

3.1 The front panel of LCD screen is of glass. When installing it please make sure to put it in place.
3.2 For service or installation it’s necessary to use specified screw lest it should damage the screen.
3.3 Be sure to take anti dust measures. Any foreign substance that happens to fall down between the screen and the glass will affect the receiving and viewing effect
3.4 When dismantling or mounting the protective partition plate that is used for anti vibration and insulation please take care to keep it in intactness so as to avoid hidden trouble.
3.5 Be sure to protect the cabinet from damage or scratch during service, dismantling or mounting.

Alignment instructions

1. Safety Instructions

Be sure to switch off the power supply before replacing or welding any components or inserting/plugging in connection wire Anti static measures to be taken (throughout the entire production process!):

a) Do not touch here and there by hand at will;

b) Be sure to use anti static electric iron;

c) It's a must for the welder to wear anti static gloves.

Please refer to the detailed list before replacing components that have special safety requirements. Do not change the specs and type at will.

2. Test equipment

VG-848 (VGA, YPbPr signal generator)

VG-849 (HDMI digital video signal generator)

CA210 (color analyzer)

3 Alignment flow

3.1 Voltage of power supply test

According to the wiring of "9232KH4601JL", connect main board, power board and IR board correctly, then switch on the main power and press key "standby" to turn on the TV set.

a) Test voltage of socket X108 each pin in turn, please refer to voltage of Table 1:

Table 1 Voltage of X108 each pin

X108	Pin1	2	3	4	5	6	7 、8	9 、10	11	12	13
Vol.	>2.5 V	0	4.85 V ～ 5.35 V	0	4.85 V ～ 5.35 V	8.55 V～ 9.45 V	0	11.4 V ～ 12.6 V	0	3.2 V ～ 3.4 V	4.9 V ～ 5.1 V

b) Test voltage of socket XV03 each pin in turn, please refer to voltage of Table 2:

Table 2 Voltage of XV03 each pin

XV03	Pin1、2、3	4、5
Vol.	0	23.8 V～25.2 V

3.2 Alignment flow chart shown as Fig. 1

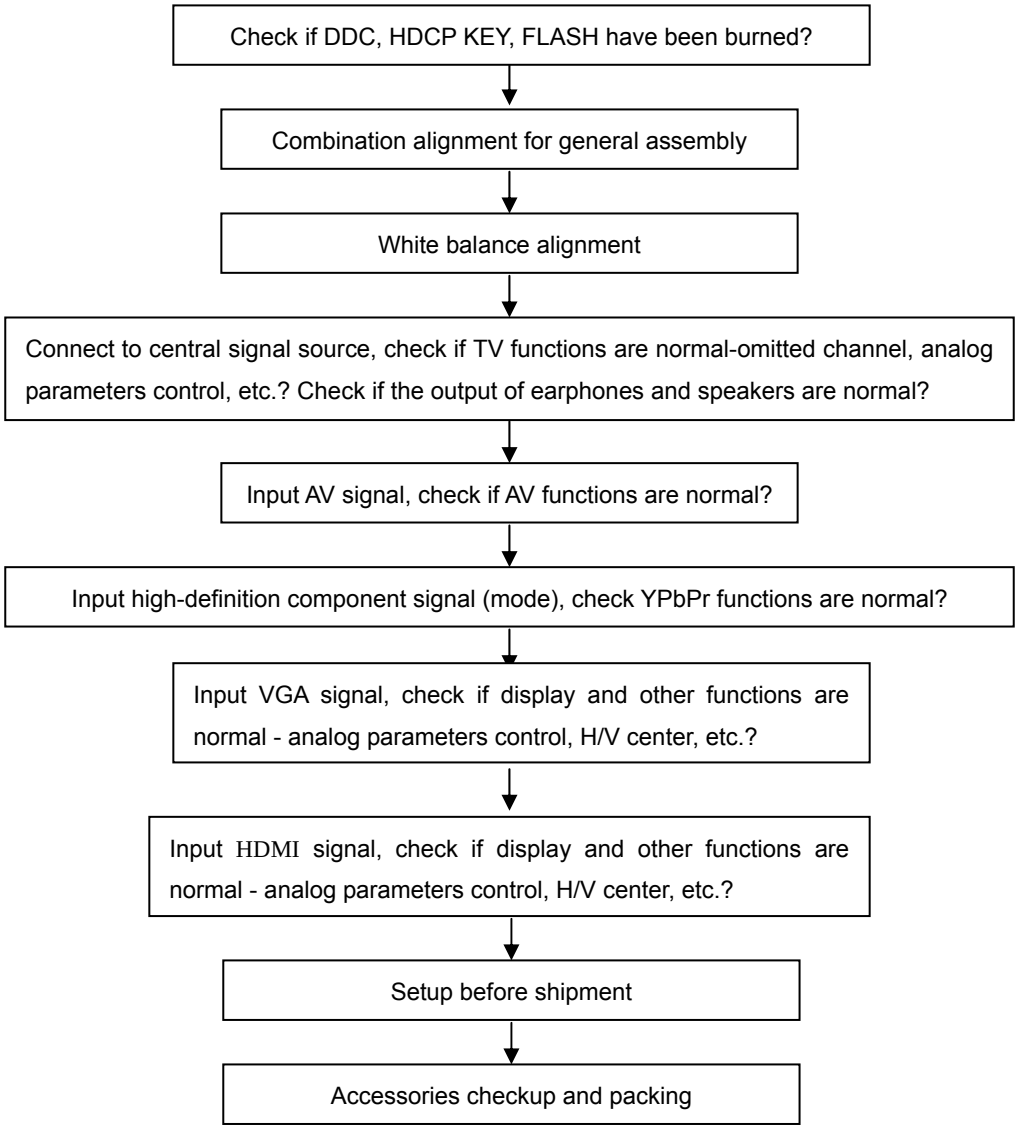

Check if DDC, HDCP KEY, FLASH have been burned?
Combination alignment for general assembly
White balance alignment
Connect to central signal source, check if TV functions are normal-omitted channel, analog parameters control, etc.? Check if the output of earphones and speakers are normal?
Input AV signal, check if AV functions are normal?
Input high-definition component signal (mode), check YPbPr functions are normal?
Input VGA signal, check if display and other functions are normal - analog parameters control, H/V center, etc.?
Input HDMI signal, check if display and other functions are normal - analog parameters control, H/V center, etc.?
Setup before shipment
Accessories checkup and packing

Fig. 1 Alignment flow chart

4 Alignment instructions

4.1 Unit adjustment

4.1.1 According to the wiring of “9232KH4601JL”, connect main board, power board and IR board correctly, then switch on the main power and press key “standby” to turn on the TV set. Check if display is normal?

4.1.2 Using method of factory menu

a) Press key “**SOURCE**” first, then press keys “**2**, **5**, **8**, **0**” in turn to enter into initial factory menu;

b) Press keys “▲” and “▼” to move cursor to each page of initial factory menu, then press “**OK**” to enter into adjusting menu of each page;

c) Press keys “▲” and “▼” to move cursor upwards or downwards within any page;

d) Press keys “◄” and “►” to do adjustment when cursor is moved to any item;

e) Press key “**MENU**” to exit menu of any page to its superior factory menu;

f) Press key “**EXIT**” to exit factory menu in any case;

g) Press key “**OK**” to enter into inferior factory menu;

h) Factory menu item: **ADC ADJUST**, for ADC calibration of VGA and Component;

i) Factory menu item: **W/B ADJUST**, for white balance adjustment;

j) Factory menu item: **POWER Mode**, for setting power-on mode; the default setting is “Standby” mode unless specified by customer;
Standby: TV set will be in “standby” mode after power-on;
MEM: TV set will keep states before last power-off;
ForceOn: TV set will turn on automatically; it also can be used as aging mode at factory;

k) Factory menu item: **Other Setting->ISP Mode**, the item will not be kept in memory, that is, it will be always in “OFF” mode after turning on again;
“**ON**”: Upgrading unit software through VGA port while connecting to ISP device;
“**OFF**”: Normal DDC functions of VGA port will recover;

l) Factory menu item: **EEPROM Init**, for factory and customer data initialization; TV set will reset and initial guiding interface will display after executing the item;

m) Factory menu item: **Factory ChA**., for factory channels presetting; it is necessary to connect to central signal source before operating the item; now digital frequency of central signal CH28（529.5 MHz）and CH33（564.5 MHz）are distributed to Australia programs; originally preset digital programs will not change along with the modification of central signal, so please operate item “DTV” of menu “Channel” to search digital programs manually, which will last about 15s;

n) Factory menu item: **Shipment**, all DTV/ATV programs for factory adjustment will be cleared out first, then ATV channels will be preset according to customer requirements; the item must be executed before shipment to clear out channels for factory adjustment;

o) Factory menu item: **Other Setting->MST DEBUG**, default setting is “OFF”, it will not be kept in memory, that is, it will always in “OFF” mode after turning on the set again;
“**OFF**”: RS232 functions of some engineering machines can match design specifications;
“**ON**”: It is convenient for design tools to debug the software;

p) Factory menu item: **Backlight**, for adjusting brightness of backlight; test voltage of X108-12# (PWM) while adjusting the item to meet the requirements of PWM voltage scope corresponding to mixture brightness described by panel specification; the item need not adjustment for it has been preset by software;

q) Factory menu item: **Other Setting->SSC ADJUST**, for expanded spectrum adjustment; the item need not adjustment for it has been preset by software;

r) Factory menu item: **Other Setting->AUDIO Curve Setting**, for sound curve adjustment; if without special customer requirements, the item need not adjustment commonly for it has been preset by software;

Note: If software is upgraded or there have been date in **EEPROM** already, please execute item "**RESET ALL**" to clear out all data before adjustment for the first time.

4.2 ADC calibration

4.2.1 ADC calibration of VGA

1） Switch "source" to VGA channel;

2） Press key "**SOURCE**", then press keys "**2**, **5**, **8**, **0**" in turn to enter into initial factory menu;

3） Move cursor to item "**ADC ADJUST**" and press key "**OK**" to enter into inferior factory menu;

4） Input VGA signal（**VG848: Timing 856（1024×768/60 Hz）, Pattern 920 Gray 8 step(H)**）; move cursor to item "**MODE** "，press keys "▲" and "▼" to select item "**RGB**"，then move cursor to item "**AUTO ADC**" and press key "**OK**" to begin auto-adjustment until completing the calibration.

4.2.2 ADC calibration of YPbPr

1） Switch "source" to YPbPr channel;

2） Press key "**SOURCE**", then press keys "**2**, **5**, **8**, **0**" in turn to enter into initial factory menu;

3） Move cursor to item "**ADC ADJUST**" and press key "OK" to enter into inferior factory menu;

4） Input Y/Pb/Pr signal（**VG848 Timing 976（720P）,Pattern 918 SMPTE Color Bar**）; move cursor to item "**MODE** "，press keys "▲" and "▼" to select item "**YPbPr**"，then move cursor to item "**AUTO ADC**" and press key "**ENTER**" to begin auto-adjustment until completing the calibration, prompt "**SUCCESS**" displaying below "**AUTO ADC**" means successful auto-calibration.

4.3 White balance adjustment

Unless specified by customer, default color temperature "**COOL**" is **12000K** and its chromatic coordinates is (**272**, **278**); color temperature "**NORMAL**" is **9300K** and its chromatic coordinates is (**285**, **293**); color temperature "**WARM**" is **6500K** and its chromatic coordinates is (**323**、**329**);

4.3.1 Adjustment procedure

TV set should be working over 30 mins to be in stabler state before white balance adjustment; Use white balance apparatus CA210 and switch to its BBY channel.

1） Switch "source" to HDMI channel;

2） Press key "**SOURCE**", then press keys "**2**, **5**, **8**, **0**" in turn to enter into initial factory menu;

3） Move cursor to item "**W/B ADJUST**" and press key "**OK**" to enter into inferior factory menu;

4） Input **DVI/HDMI** signal (**16 Gray Scale Signal: 1024×768/60Hz**, **TIMING: 856**, **PATTERN:921**); move cursor to item "**MODE**", press keys "▲" and "▼" to select item "**HDMI1**" or other HDMI channels, then move cursor to item "**TEMPERATURE**" and press keys "▲" and "▼" to select item "**COOL**";

5） Adjust items "**R-GAIN**, **G-GAIN**, **B-GAIN**" to set chromatic coordinates of **14th** scale as (**272, 278**);

6） Adjust items "**R-OFFSET**, **G-OFFSET**, **B-OFFSET**" to set chromatic coordinates of **4th** scale as (**272, 278**);

7）During adjustment, make sure that chromatic coordinates of bright scale are (**X=272±10**, **Y=278±10**) and chromatic coordinates of dark scale are (**X=272±10**, **Y=278±10**);

8）Move cursor to item "**COPY ALL**" again to copy data of white balance to other channels except **DTV**;

9）Check if chromatic coordinates of **HDMI NORMAL** and **WARM** meet the requirements of error allowance (dark scale: **±10**, bright scale: **±10**) or not, otherwise adjust items "**R_GAIN/B_GAIN/R_OFF/B_OFF**" to meet them and then save the data;

10) Switch to other channels (**ATV, AV，COMPONENT，D-SUB**), check if chromatic coordinates of **COOL, NORMAL** and **WARM** meet the requirements or not, if not, adjust them respectively in the same way of HDMI and with 16 gray scale signal; exit menu "**W/B ADJUST**" after adjustment, the data will be save automatically;

11) DTV adjustment: switch to **DTV** channel, select **16** gray scale program, enter into factory menu, do adjustment following above step 5, 6, 7;

12) Please refer to the adjusting rules as follows:

B Gun: coordinates of **X** and **Y** will increase when **B** gun is adjusted downwards;
coordinates of **X** and **Y** will decrease when **B** gun is adjusted upwards;

R Gun: adjusting **R** gun will effect coordinate of **X**, and value of **Lv** slightly;
coordinate of **X** will increase when **R** gun is adjusted upwards;
coordinate of **X** will decrease when **R** gun is adjusted downwards;

G Gun: adjusting **G** gun will effect coordinate of **Y**, and value of **Lv** greatly;
coordinate of **Y** will increase when **G** gun is adjusted upwards;
coordinate of **Y** will decrease when **G** gun is adjusted downwards;

Note: Default color temperature specified by **SANYO** customer is **Normal**, adjust chromatic coordinates of **Normal** and **Cool** in **Dynamic** picture mode; adjust chromatic coordinates of **Cool** in **Dynamic** picture mode for other customers.

5 **Functions checkup**

5.1 TV functions

Input central signal to RF port, enter into menu "**CHANNEL**" first, then search channels automatically, check if there is any omitted channel, check if the output of speakers and the picture are normal.

5.2 AV port

Input signal to AV port respectively, check if the picture and the sound are normal.

5.3 YPbPr/YCbCr port

Input YUV signal from VG848 signal generator with YUV formats listed as Table 3 respectively, check if the picture and the sound are normal under the circumstances of power-on/off, switching channel and format, etc..

Table 3 YUV signal formats

No.	Definition	H. - fre.（kHz）	V. – fre.（Hz）	Dot pulse fre.（MHz）	Note
1	720×480	15.734	60	13.5	480i(NTSC)
2	720×480	15.734	59.94	13.5	480i(NTSC)
3	720×576	15.625	50	13.5	576i(PAL)
4	720×480	31.469	60	27	480p(NTSC PROG)
5	720×480	31.469	59.94	27	480p(NTSC PROG)

No.	Definition	H. - fre.（kHz）	V. – fre.（Hz）	Dot pulse fre.（MHz）	Note
6	720×576	31.25	50	27	576p(PAL PROG)
7	1280×720	45	59.94	74.18	720p(59p)
8	1280×720	45	60	74.25	720p(60p)
9	1280×720	37.5	50	74.25	720p(50p)
10	1920×1080	33.75	59.94	74.25	1080i(59i)
11	1920×1080	33.75	60	74.25	1080i(60i)
12	1920×1080	28.125	50	74.25	1080i(50i)
13	1920×1080	67.5	59.94	148.35	1080p(59p)
14	1920×1080	67.5	60	148.5	1080p(60p)
15	1920×1080	56.25	50	148.5	1080p(50p)
16	1920×1080	-	23.94/24	-	-
17	1920×1080	-	25	-	-
18	1920×1080	-	29.97/30	-	-

5.4 VGA port

Input signal from VG848 signal generator to VGA port with VGA signal formats listed in Table 4 respectively, check if the display and the sound are normal; if there is any H/V offset, enter into main menu and select items “**Picture->Screen->Auto Adjusting**” in turn to make calibration automatically.

Table 4 VGA signal formats

No.	Definition	H. - fre.（kHz）	V. – fre.（Hz）	Dot pulse fre.（MHz）	Note
1	640×480	31.469	59.94	25.175	IBM
2	720×400	31.469	70.086	28.322	IBM
3	640×480	37.861	72.809	31.5	VESA
4	640×480	37.5	75	31.5	VESA
5	800×600	35.156	56.25	36	VESA
6	800×600	37.879	60.317	40	VESA
7	800×600	48.077	72.188	50	VESA
8	800×600	46.875	75	49.5	VESA
9	1024×768	48.363	60.004	65	VESA
10	1024×768	56.476	70.069	75	VESA
11	1024×768	60.023	75.029	78.75	VESA
12	1152×864	67.5	75	108	VESA
13	1280×960	60	60	108	VESA
14	1280×1024	63.98	60.02	108	VESA
15	1280×1024	80	75	135	SXGA
16	1440×900	-	60	-	-
17	1680×1050	-	60	-	-
18	1360×768	47.7	60	85.5	-

5.5 USB port

5.5.1 PVR function

Insert formatted USB memory containing recorded-program files, press key “**record list**” to select and play program, check if the picture, the sound and other functions are normal.

5.5.2 Media playing function:

Insert USB memory containing files of picture, audio and video, check if the picture, the sound and other functions are normal.

5.6 MUSIC port (only for SANYO model)

Input audio signal from sound output device to side music port, check if the sound is normal.

5.7 HDMI port

Input HDMI signal from VG849 signal generator to HDMI port with the formats listed in Table 3 and Table 4 respectively, check if the display and the sound (32 kHz, 44.1 kHz, 48 kHz) are normal under the circumstances of power-on, switching channels or formats, etc

5.8 Other functions checkup

Check if functions - timing on/off, sleeping off, picture/sound mode, OSD, stereo and digital audio ports, etc., are normal;

Check if pure audio program (**RADIO**) are normal when switching to digital programs;

Check if functions of **LCN** and **OTA** are normal.

6 User menu setup before shipment

Enter into page "**LOCK**" of user menu, select item "**Restore Factory Default**" to make setup before shipment.

Main procedures as follows:

1）Clear out information of all programs;

2）Clear out information about **VCHIP** – parents control;

3）Default analog parameters setup for user;

4）Set Menu Language as "**English**";

5）Set Power on mode as "**Off**".

Method of software upgrading instructions

Factory software burned instructions listed as Table 5

Table 5　Factory software burned instructions

No.	Part No.	Part Type	Software function	Burned before SMT	Burning method
N803	5276405001	MX25L6405DMI-12G	FLASH	Yes	Use ALL11 with write-protect, refer to Note 1 in detail.
N804	5272404002	AT24C04	HDCP KEY	Yes	ALL11
NA04	5272402002	AT24C02	HDMI EDID	Yes	ALL11
NA05	5272402002	AT24C02	HDMI EDID	Yes	ALL11
NA06	5272402002	AT24C02	HDMI EDID (for example, supporting the third channel HDMI)	Yes	ALL11
N106	5272402002	AT24C02	VGA　EDID	Yes	ALL11

Note 1: Method of **w**rite-protect setup:　enter into burning interface of ALL-100, tick option "**Config**", press item "**config Setting**", set option "**Protect**" as "**All Protect**"; make sure that option "**Config**" must be ticked before burning software and write-protect must be reset after ALL-100 burning software opened every time.

Note 2: Method of burning and upgrading software by using ISP burning device:

1） For main board upgrade: Connect the cable of ISP burning device to Debug port (**X107**) of main board; for TV set upgrade, connect both VGA ports of ISP burning device and main board, enter into factory menu and set item "**ISP Mode**" as "**ON**";

2） Using **Mstar** online burning program (**V4.4.2.0** or higher versions), enter into menu "**Device**", tick option "**WP Pin pull to high during ISP**" to ensure that hardware write-protect of Flash is removed and erasing process is normal, please refer to Fig. 2;

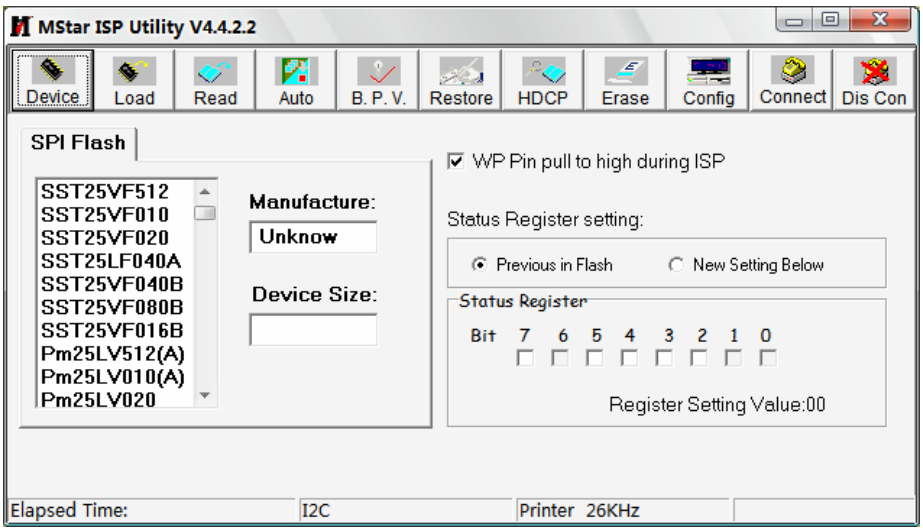


Fig. 2　Write-protect setup

3） Press menu “**Connect**”, a dialog box “**Device Type is MX25L64**” will pop up, that is, connection has been successful, please refer to Fig. 3;

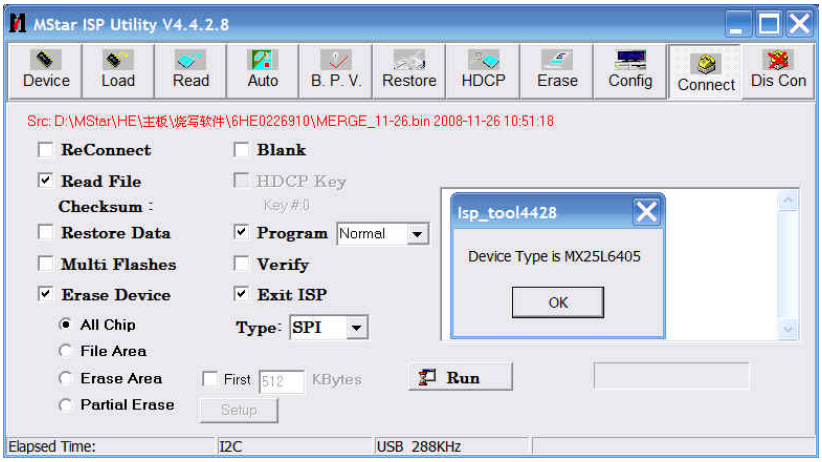


Fig. 3　Successful connection to device **MX25L64**

If the connection is failed, press the first menu “**Device**” and select its option “**MX25L64**”, then press menu “**Connect**” again;

4） Press menu “**Read**”, select the burning file, such as “**MERGE.bin**”, please refer to Fig. 4

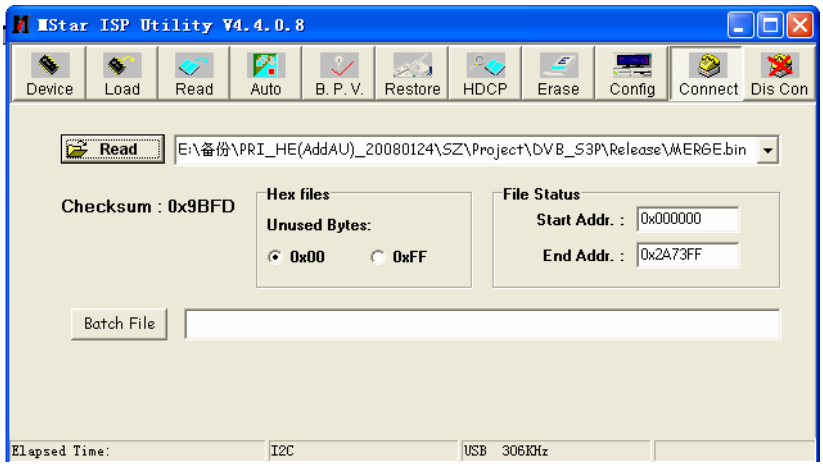


Fig. 4　Burning file selection

5） Press menu “**Auto**”, tick options “**All chip**” and “**program**”, please refer option switches to Fig.5;

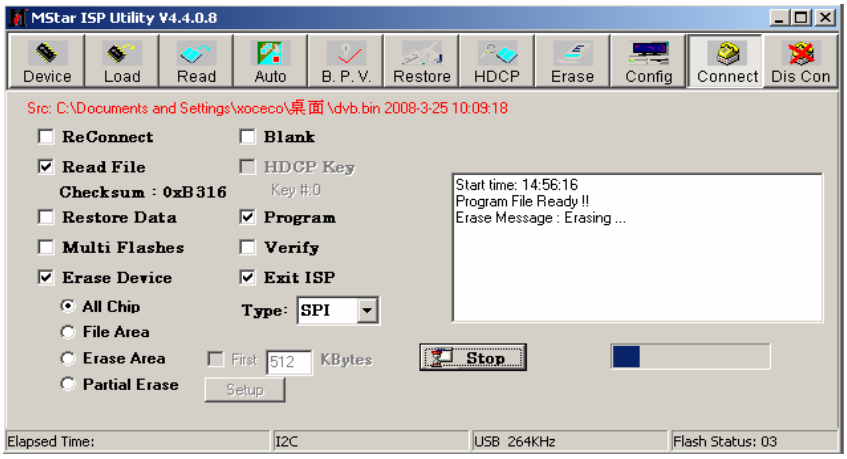


Fig. 5　Option switches

6） Press button “**Run**” to begin burning process, which includes two steps: **Erase** and **Program**;

Normal burning process is described as follows:

First, the step “**Erasing…， Flash Status: 03**” will last for some time, or it is failed if it is passed by quickly, please confirm procedure **2**）and begin burning process again; then the following step is “**Programming…，Flash Status:00**”; at last, a prompt “**Pass**” will display.

7） A prompt “**Pass**” will display beside button “**Run**” if burning process is successful, please refer to Fig. 6;

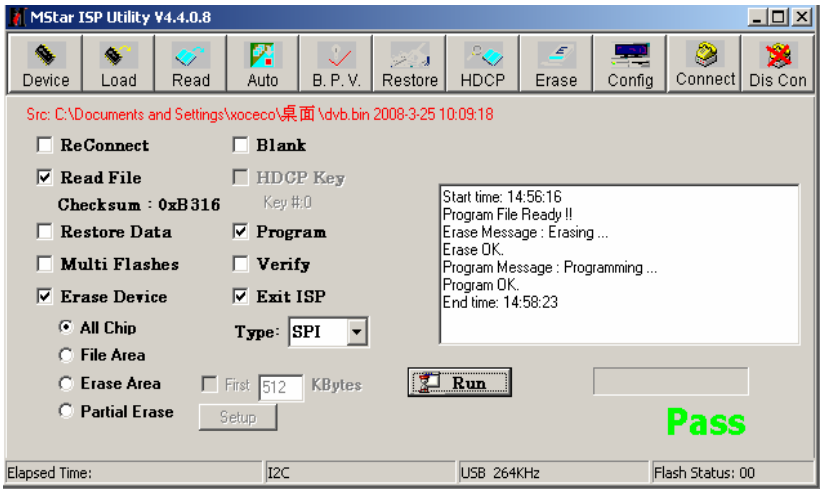


Fig. 6 A prompt “**Pass**” displaying beside button “**Run**” for successful burning process

8） If there are other machines to be burned, remain **ISP** burning interface and repeat procedures **3**）and **5**）only;

Note 3: Method of online burning and upgrade through **USB**:

1） Make sure that U disk is formatted as “**FAT32**”;

2） Copy firmware “**Merge.bin**” to U disk;

3） Power on TV set, be sure to be in channel of **ATV** or **DTV** and have not any OSD interface, insert U disk into USB port of TV set;

a) First press key “**SOURCE**”, then press keys “**2**, **5**, **8**, **0**” in turn to enter into initial factory menu;

b) Select item “**software update**” to begin upgrade;

4） Upgrade process:

A、Read data from U disk, while data indicator light of U disk is twinkling at the same time;

B、Begin to burn Flash，the unit will be in “**standby**” mode after burning process completed;

5） Please restart the unit after power-off of hardware, then enter into factory menu, confirm software parameters - version and time, execute item “**RESET ALL**” to complete the whole process.

*** USB burning method could not be sure to all kinds of U disks, so please try another U disk if one is inapplicable.

Working principle analysis of the unit

Signal Flow

1、 PAL signal flow

Send PAL analog RF signal received from antenna to TUNER **FT2119** which is controlled by main chip **MSD209GL** through **I^2C** BUS; after frequency conversion by Tuner, analog IF output signal is pre-amplified and then filtered by both picture and sound SAW, then it is sent out to demodulator IC **MSB1210**; CVBS video signal and SIF audio differential signal will be outputted after demodulation;

CVBS video signal is sent into main chip **MSD209GL** to be processed by modules of video decoding, deinterlacing, video processing and zoom, then LVDS signal will be outputted to drive display panel;

SIF audio differential signal is sent into main chip **MSD209GL** to be demodulated to analog audio signal, then it is sent to earphone amplifier **BH3547F** to be amplified after the processes of preamplification, acoustic effect processing and volume control, and then it is divided into two, one is sent to earphone jack, the other is sent to digital audio power amplifier **R2A15112** to be amplified and then drive speakers.

2、 DVB-T signal flow

Send DVB-T digital RF signal received from antenna to TUNER **FT2119** which is controlled by main chip **MSD209GL** through **I^2C** BUS; after down frequency conversion, differential IF signal will be inputted to demodulator IC **MSB1210** to be demodulated; then it will be sent to main chip **MSD209GL** with the standard format of serial TS stream for demultiplexing and decoding;

Video route: digital video signal is sent into main chip **MSD209GL** for decoding and video processing after demultiplexing, then LVDS signal will be outputted to drive display panel;

Audio route: digital audio signal will be sent into main chip **MSD209GL** for decoding and audio processing after demultiplexing, then dual-sound-track analog audio signal (stereo) is sent to earphone amplifier **BH3547F** to be amplified after the processes of preamplification, acoustic effect processing and volume control by main chip **MSD209GL**, then one is sent to earphone jack, the other is sent to digital audio power amplifier **R2A15112** to be amplified and then drive speakers.

3、 AV input signal flow

AV video signal is sent into main chip **MSD209GL** to be processed by modules of video decoding, deinterlacing, video processing and zoom, then LVDS signal will be outputted to drive display panel;

AV audio signal is sent into main chip **MSD209GL** for acoustic effect processing and volume control after the processing of voltage division, impendence matching and AC coupling, then it is sent to earphone amplifier **BH3547F** to be amplified, one is sent to earphone jack, the other is sent to digital audio power amplifier **R2A15112** to be amplified and then drive speakers.

4、 D-SUB/YPbPr input signal flow

D-SUB/YPbPr video signal is sent into main chip **MSD209GL** to be processed by modules of A/D conversion, video decoding, deinterlacing, video processing and zoom, then LVDS signal will be outputted to drive display panel;

D-SUB/YPbPr audio signal is sent into main chip **MSD209GL** for acoustic effect processing and volume control after the processing of voltage division, impendence matching and AC coupling, then it is sent to earphone amplifier **BH3547F** to be amplified, one is sent to earphone jack, the other is sent to digital audio power amplifier **R2A15112** to be amplified and then drive speakers.

5、 HDMI input signal flow

HDMI video signal is sent into main chip **MSD209GL** to be processed by modules of video decoding, video processing and zoom, then LVDS signal will be outputted to drive display panel;

HDMI audio signal is sent into main chip **MSD209GL** for audio processing, preamplification, acoustic effect processing and volume control, then it is sent to earphone amplifier **BH3547F** to be amplified, one is sent to earphone jack, the other is sent to digital audio power amplifier **R2A15112** to be amplified and then drive speakers.

6、 AV input signal flow

Current active AV video signal is sent into main chip **MSD209GL** for video coding, then it is amplified by peripheral video amplified circuits and then outputted;

Current active AV audio signal is sent into main chip **MSD209GL** for preamplification, acoustic effect processing and volume control, then it is sent to operation amplifier to be amplified and then outputted.

Brief Instruction of the Unit

MPEG-2 MP@HL、H.264 Main and High profile up to Leve4.0 Decoding

MPEG、Dolby Digital（AC-3）、Digital audio decoding (AAC)

3D comb filter

Wide range power supply, low power consumption in standby mode（≤1W）

Audio power amplifier (class D), HI-quality acoustic effect output

Hi-quality processing of interlaced to progressive scanning

Real integrative functions realization:

- Integrative structure
- Integrative Tuner (A/D integration)
- Channel-searching integration
- OSD interface integration

Main components of the unit:

4 0" LCD panel（1920X1080）

Main chip：MStar MSD209GL-LF

Demodulator chip：MStar MSB1210-LF

Tuner：NXP FT2119

DDR：SAMSUNG K4T1G164QE-HCF7

Power amplifier (class D)：RENESAS R2A15112

FLASH ：MX25L6405DMI-12G

External interfaces of the unit:

Two groups of Video and one group of RCA L/R input

Three groups of HDMI input

One group of VGA input

One group of audio input For VGA and DVI（Mini Phone Jack）

Two groups of YPBPR以及 RCA L/R input

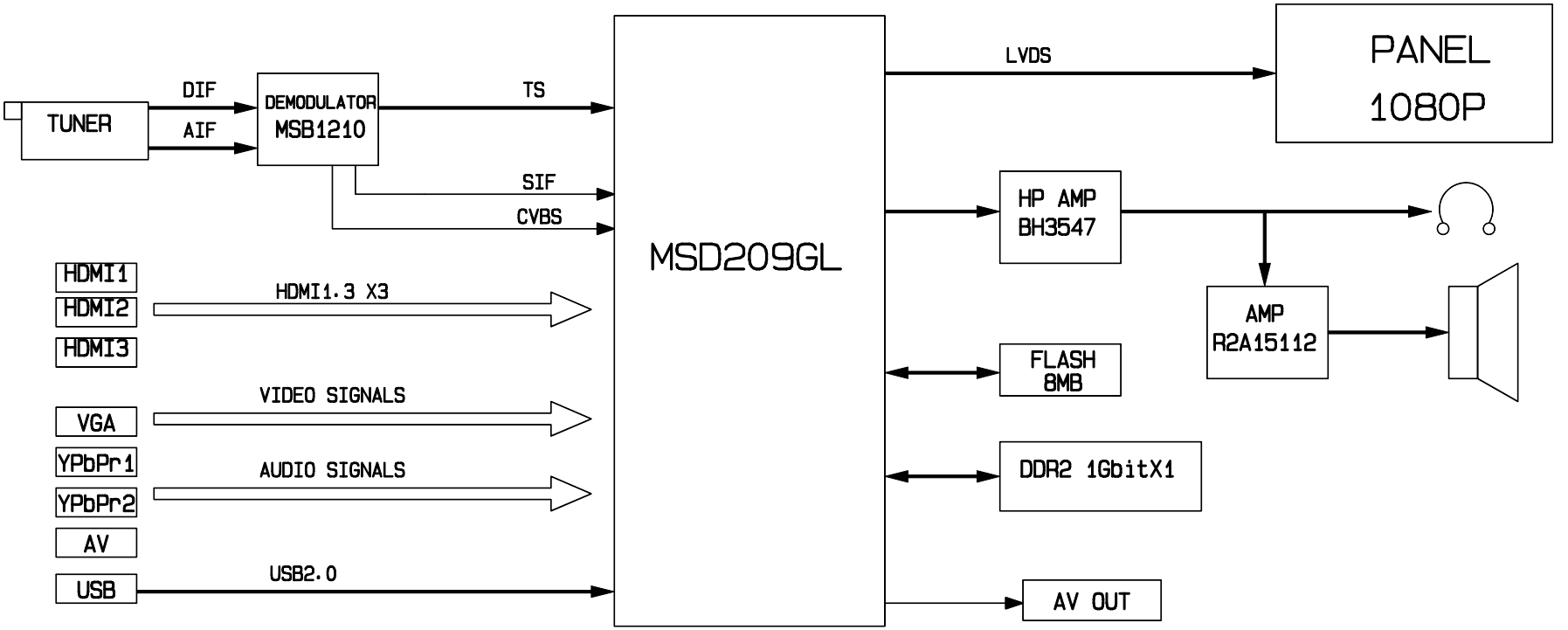
One group of RF

One group of RS232（Mini Phone Jack）

One group of audio output（Mini Phone Jack）

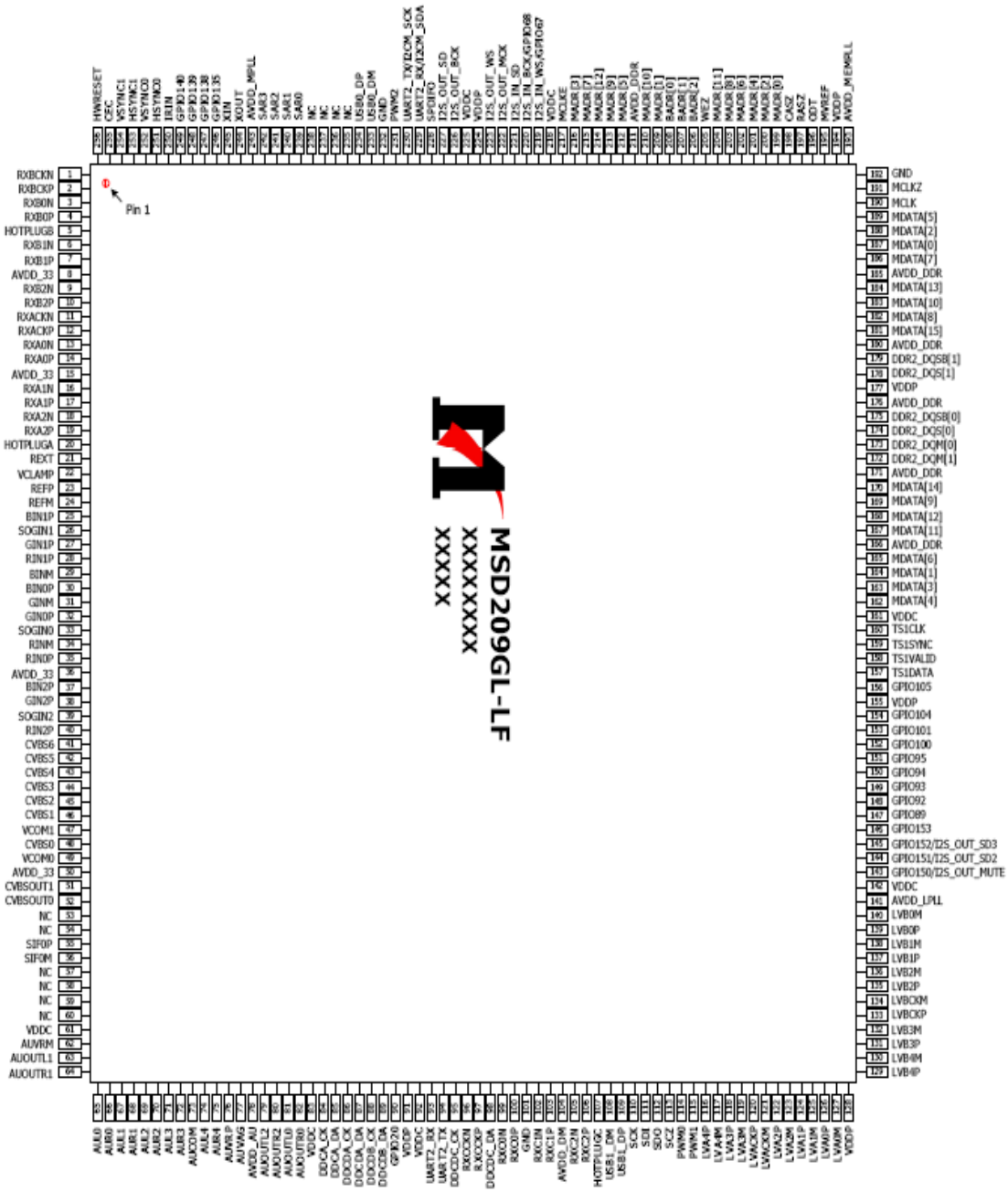
One group of Video and RCA L/R output
One group of SPDIF（coaxial）output
One group of USB for upgrading

Block diagram



IC Block Diagram and Instruction

1、 Main chip **MSD209GL**:



GENERAL DESCRIPTION

The MSD209GL is a highly integrated controller IC for LCD/PDP DTV applications with resolutions up to full-HD(1920 x 1080). It is configured with an integrated triple-ADC/PLL, a multi-standard TV video and audio decoder, amotion adaptive video de-interlacer, a scaling engine, the MStarACE-3 color engine, an advanced 2D graphics engine, a transport processor, a high-definition (HD) MPEG video decoder, a high-definition (HD)

H.264 video decoder, a RealVideo decoder, a JPEG video decoder, a MPEG-4 decoder, and a 24-bit DSP for MPEG audio decoding, a DVI/HDCP/HDMI receiver, and a peripheral control unit providing a variety of HDTV control functions.
For digital TV application, the MSD209GL comprises an MPEG-2 transport processor with advanced section filtering capability, an MPEG-2 (MP@HL profile) video decoder, a MPEG-4 decoder, a H.264 video decoder, and an audio DSP decoder for MPEG audio streams, MPEG layer I and II digital audio decoder with analog audio outputs that are designed to support existing and future DVB-T programs while handling conditional access. Furthermore,it is also possible to decode JPEG, RealVideo streams, and MP3 formats from external sources such as USB interface.
For analog TV, the MSD209GL includes NTSC/PAL/SECAM multi-standard video decoder comprising a 3D motion adaptive comb filter and time-based correction, and a NICAM/A2 audio decoder to support worldwide television standards. The MSD209GL is also configured with a VBI processor to decode digital information such as Close Caption/V-chip/teletext/WSS/CGMS-A/VPS. In addition, the MStar advanced LCD TV processor enhances video quality, motion adaptive de-interlacer, picture quality adjustment units, and MStarACE-3 color engine.
With USB 2.0 host controllers, UART, IR, SPI, I2C, and PWM, the MSD209GL fulfills all requirements in advanced DTV sets. To reduce system costs, the MSD209GL also integrates intelligent power management control capability for green-mode requirements and spread-spectrum support for EMI management.

MSD209GL Features：

. Twin-turbo 8051 Micro-controller

.·Twin-turbo 8051 MCU
.·Interrupt controller
.·Supports ISP
.·Two full duplex UARTs
.·DMA engine to speed up large data movement

. Transport Stream De-multiplexer

.·Supports serial TS interface, with or without sync signal
.·Maximum TS data rate is 104 Mb/sec
.·32 general purpose PID filters and section filters for each transport stream de-multiplexer
.·One video PES and one audio PES channel
· Supports DVB subtitle and digital teletext
.·Supports additional audio/video/PCR filters
.·Supports TS DMA channel for time-shift

. MPEG-2 A/V Decoder

.·ISO/IEC 13818-2 MPEG-2 video MP@HL
.·Supports resolution in HDTV (1080i, 720p) and SDTV

.·Supports MPEG-1, MPEG-2 (Layer I/II), Dolby Digital (AC-3), and AAC audio decoding

. MPEG-4 Video Decoder

.·ISO/IEC 14496-2 MPEG-4 ASP video decoding

.·Supports resolution in HDTV (1080p@30fps)

. H.264 Decoder

.·ITU-T H.264, ISO/IEC 14496-10 (main and high profile up to level 4.0) video decoding

.·Supports resolutions for all DVB, ATSC, HDTV, DVD and VCD

.·Supports resolution up to 1080p@30fps

.·Supports CABAC and CAVLC stream types

.·Processing of ES and PES streams, extractions and provision of time stamps

. RealMedia Decoder

.·Supports maximum resolution up to 720p@30fps

.·Supports RV8, RV9, RV10, RA8-LBR and HE-AAC decoders

.·Supports file formats with RM and RMVB

.·Supports Picture Re-sampling

.·Supports in-loop de-block for B-frame

. Hardware JPEG

.·Supports sequential mode, single scan

.·Supports both color and grayscale picture

.·Operates in scan unit; hardware decoder will handle the bit stream after scan header

.·Supports programmable region of interest (ROI)

.·Supports scaling down ratio: 1/2, 1/4, 1/8, applied to height and width simultaneously

. NTSC/PAL/SECAM Video Decoder

.·Supports NTSC-M, NTSC-J, NTSC-4.43, PAL (B, D, G, H, M, N, I, Nc), and SECAM

.·Automatic TV standard detection

.·Motion adaptive 3D comb filter for NTSC/PAL

.·Supports Teletext level-1.5, Closed Caption (analog CC 608/ analog CC 708/digital CC 608/digital CC 708), V-chip and SCTE

.·Two CVBS video outputs

. Multi-Standard TV Sound Processor

.·Supports BTSC/A2/EIA-J demodulation in NTSC and A2/NICAM/FM/AM demodulation in PAL

.·Supports MTS Mode Mono/Stereo/SAP in BTSC/EIA-J and Mono/Stereo/Dual in A2/NICAM

.·Built-in audio DAC's

.·Audio processing for loudspeaker channel, including volume, balance, mute, tone, EQ, virtual stereo/surround, and treble/bass

.·Supports digital audio format decoding:

.˜MPEG-1, MPEG-2 (Layer I/II), MP3, AC-3 (Dolby Digital), AAC-LC, WMA

. Digital Audio Interface

.·I2S digital audio input & output

.·S/PDIF digital audio input & output

.·HDMI audio channel processing capability

.·Programmable delay for audio/video synchronization

. Analog RGB Compliant Input Ports

.·Three analog ports support up to 1080P

.·Supports PC RGB input up to SXGA@75Hz

.·Supports HDTV RGB/YPbPr/YCbCr

.·Supports Composite Sync and SOG (Sync-on-Green) separator

.·Automatic color calibration

. DVI/HDCP/HDMI Compliant Input Port

.·Three DVI/HDCP/HDMI input ports support up to 225MHz @ 1080P 60Hz with 12-bit deep-color resolution

.·Single link on-chip DVI 1.0 compliant receiver

.·High-bandwidth Digital Content Protection (HDCP) 1.1 compliant receiver

.·High Definition Multimedia Interface (HDMI) 1.3 compliant receiver with CEC (Consumer Electronics Control) support

.·Long-cable tolerant robust receiving

. MACE-4, MStar Advanced Color Engine year 2009 Edition, provides superb visual quality for wider gamut FHD panels

.·Fully programmable shrink/zoom capabilities

.·Panorama and various scaling supports

.·3D motion adaptive video de-interlacers with de-flickering and edge smoothing functions

.·Automatic 3:2 pull-down & 2:2 pull-down detection and recovery

.·Supports sRGB and xvYCC color processing

.·Supports HDMI 1.3 deep color format

.·Supports linear/nonlinear color mapping for wider gamut panels

.·10-bit internal data processing

.·Programmable 12-bit RGB gamma CLUT

.·3D video noise reduction

.·MPEG artifact removal including de-blocking and mosquito noise reduction

.·Frame rate conversion

. Output Interface

.·Supports up to 10-bit dual LVDS full-HD (1920 x 1080) panel interface

.·Supports 2 data output formats: Thine & TI data mappings

.·Spread spectrum output frequency for EMI suppression

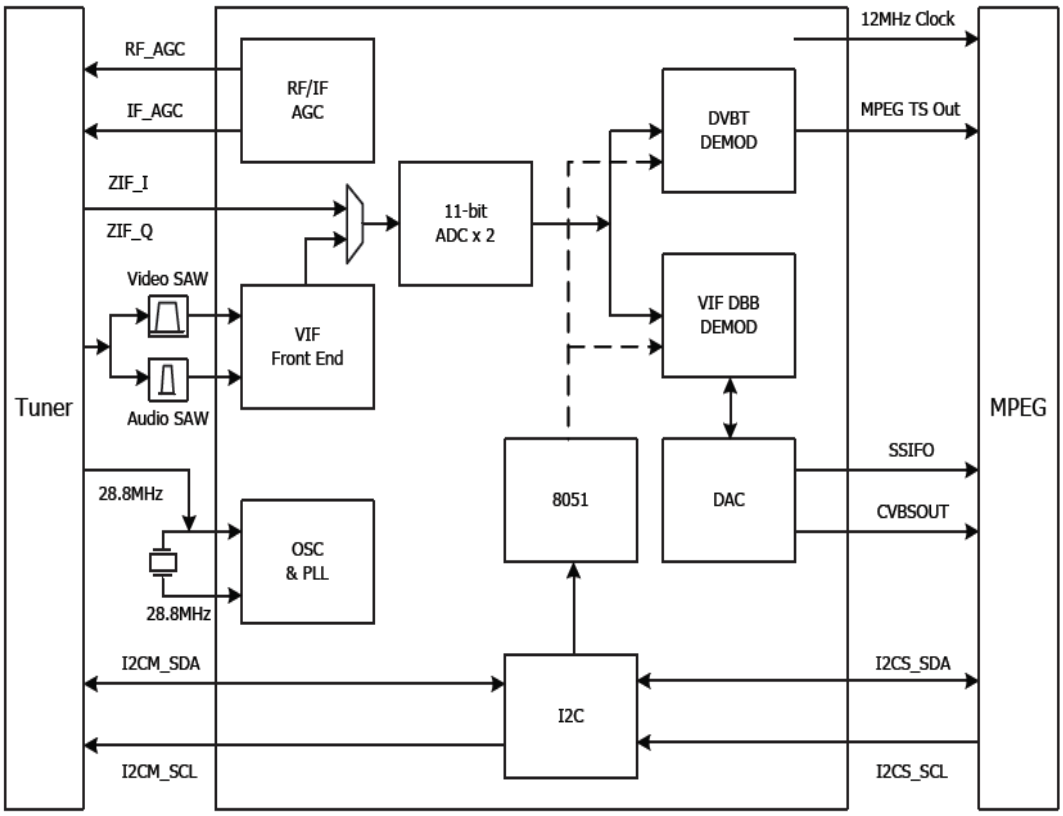
. CVBS Video Output

. 2D Graphics Engine

.·256-pin LQFP package

.·Operating at 1.26V (core), 1.8V (DDR2), and 3.3V (I/O and analog)

2、 MSB1210 (Digital DVB-T/VIF Demodulator MSB1210)



Integrated DVBT Receiver

.·Compliant with DVBT(ETSI ET 300 744)

.·Supports 2K, 4K, 8K and 1/4, 1/8, 1/16, 1/32 guard interval (GI) and hierarchical, non-hierarchical modes

.·Nordig Unified 1.0.3, D-Book, E-Book, IEC62002 (MBRAI) compliant

.·Dual 11-bit ADCs: accept IF, low IF, zero-IF inputs in 5, 6, 7, 8MHz channel bandwidths

.·All digital demodulation and timing recovery loops

.·CCI and ACI rejection capability

.·Independent ADC controls (for IF and RF)

.·Configurable parallel/serial MPEG-2 transport stream interface

.·Impulse-Noise suppression

.·Advanced performance for SFN networks

.·Supports single or dual AGC control

.·Direct 36MHz, 44MHz IF sampling scheme from tuner

.·Full-digital frequency offset recovery with wide acquisition range (+/-500kHz)

.·IQ imbalance compensation for ZIF

. Integrated VIF receiver

.·Multi-standard analog TV receiver applications

.·Digital low IF architecture

.·Maximum IF gain of 48dB

.·Programmable TOP to accommodate different tuner gain to optimize noise and linearity

performance

. Miscellaneous

.·Embedded 8-bit MCU

.·Clock generation from a single 24MHz crystal

.·Supports I2C interface with bypass mode

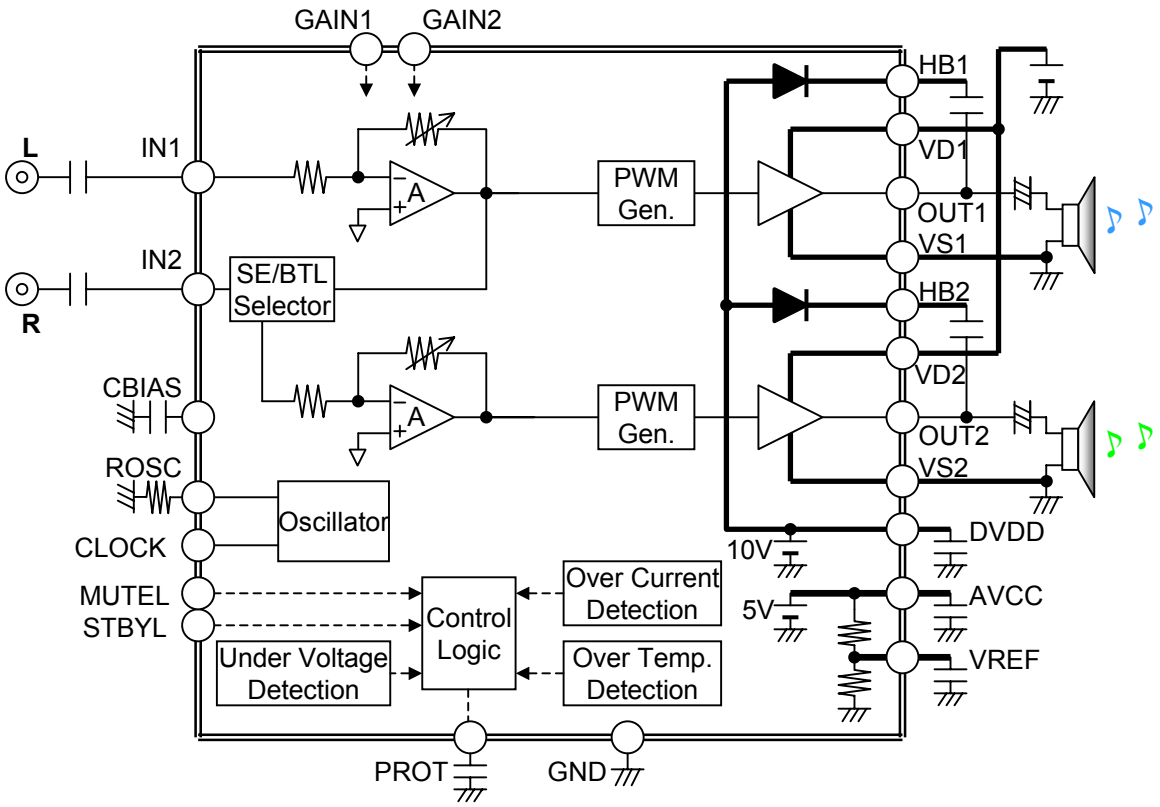
.·Operating voltage: 3.3V and 1.2V

.·48-pin LQFP package

3、Audio power amplifier **RENESAS R2A15112**

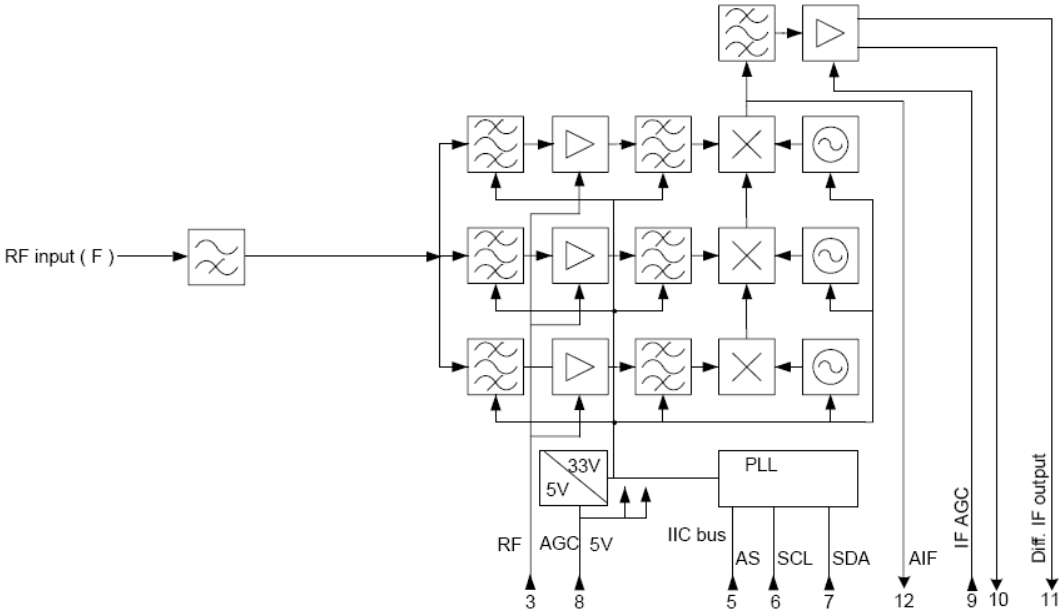
R2A15112FP is a Digital Power Amplifier IC developed for TV.
R2A15112FP has a maximum power of 15W(typ) × 2ch.
(VD = 24V,THD = 1%, SE) at a 4 Ω load.
It is possible to replace a conventional analog amplifier
with a digital amplifier easily.

●Maximum power out put (No external heat sink)
(note) These apply when the thermal pad is soldered to
the printed-circuit board directly.
Recommended Power Condition
SE operation mode :15Wx2ch(VD=24V,4Ω load,THD+N:1%）
BTL operation mode:30Wx1ch(VD=21V,8Ω load,THD+N:10%）
●Highly efficient, low noise, and low distortion
●Popless
●Built-in protection - Overcurrent, overheat, and undervoltage
●Built-in Mute and Standby function
●The gain can be changed to four settings by two terminals.
●Power supply voltage : 11V to 25V
●Speaker Impedance : from 4 to 8Ω

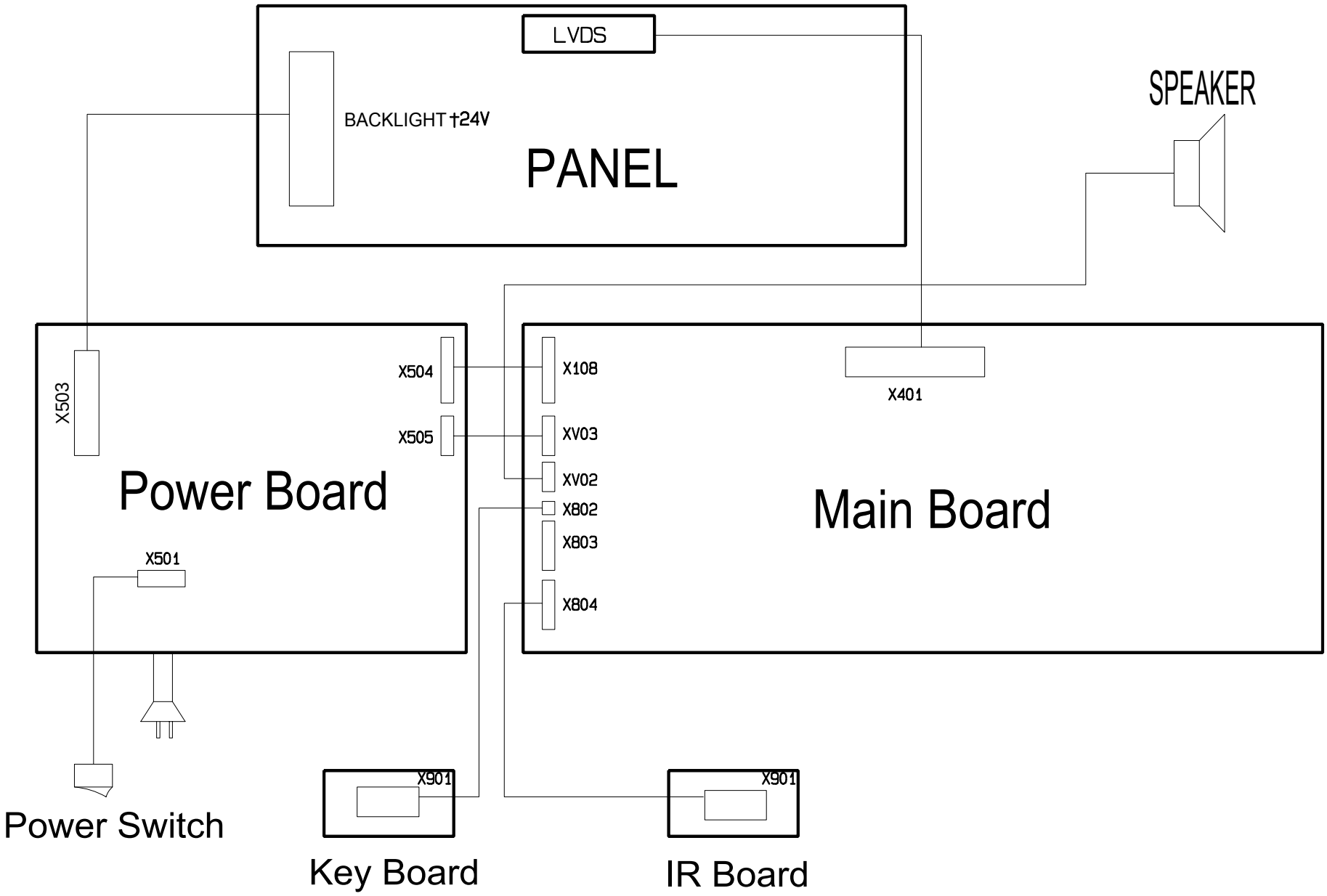


4、 Tuner：FT2119

FT 2119 are newly developed low-cost Half-NIM modules designed for both digital (DVB-T/C) and analog TV reception in compliance with the European ATV standards for analogue, as well as with the terrestrial standard ETS 300 744 and cable standard ETS 300 429 for digital. It consists of a 3-band RF tuner, which receives RF signal and down-converts it to an IF frequency of 36MHz for digital and 38.9MHz for analog IF. The analogue IF output can directly drive a SAW filter. A digital IF Stage, which consists of one SAW filter & gaincontrollable IF that offers a sufficient output level to be connected directly to an A/D converter

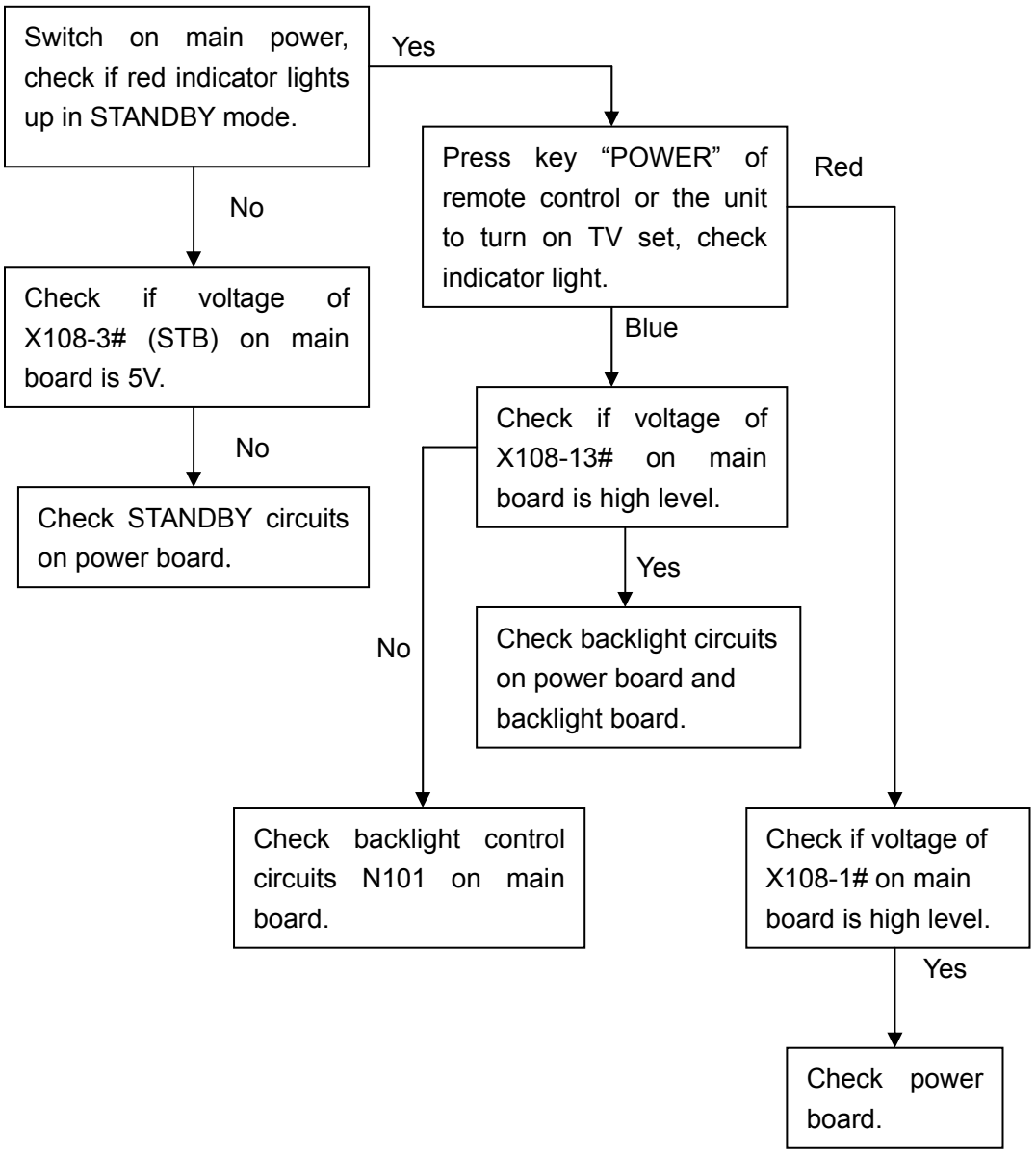


WIRING DIAGRAM

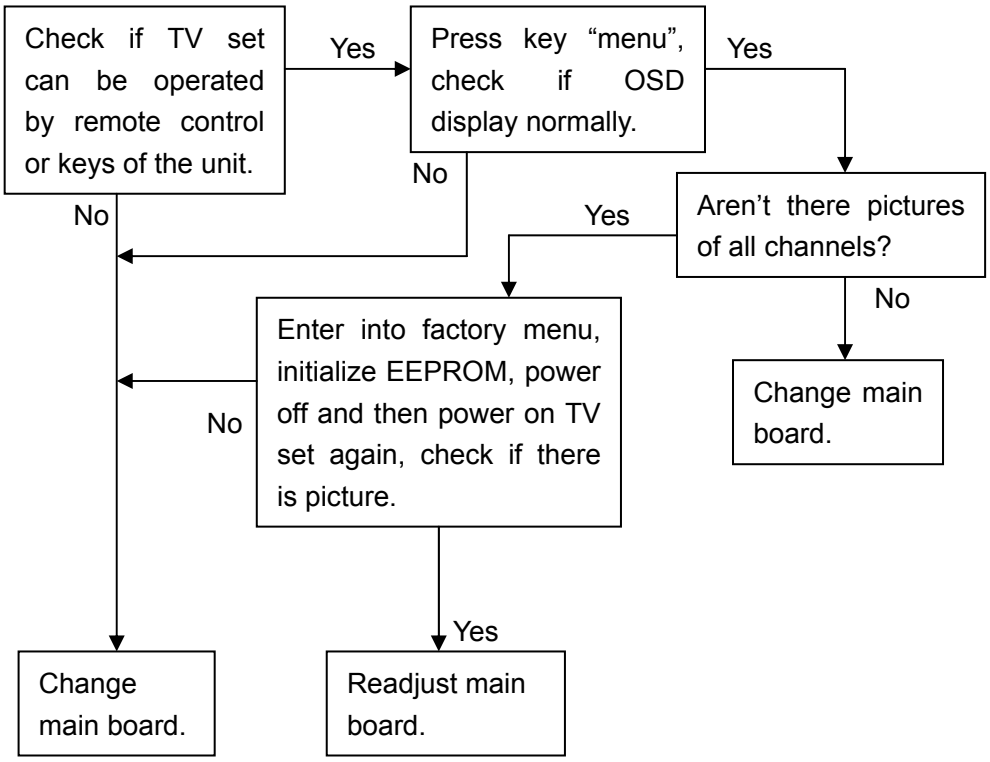


Troubleshooting guide LCD-40XR10F(D)

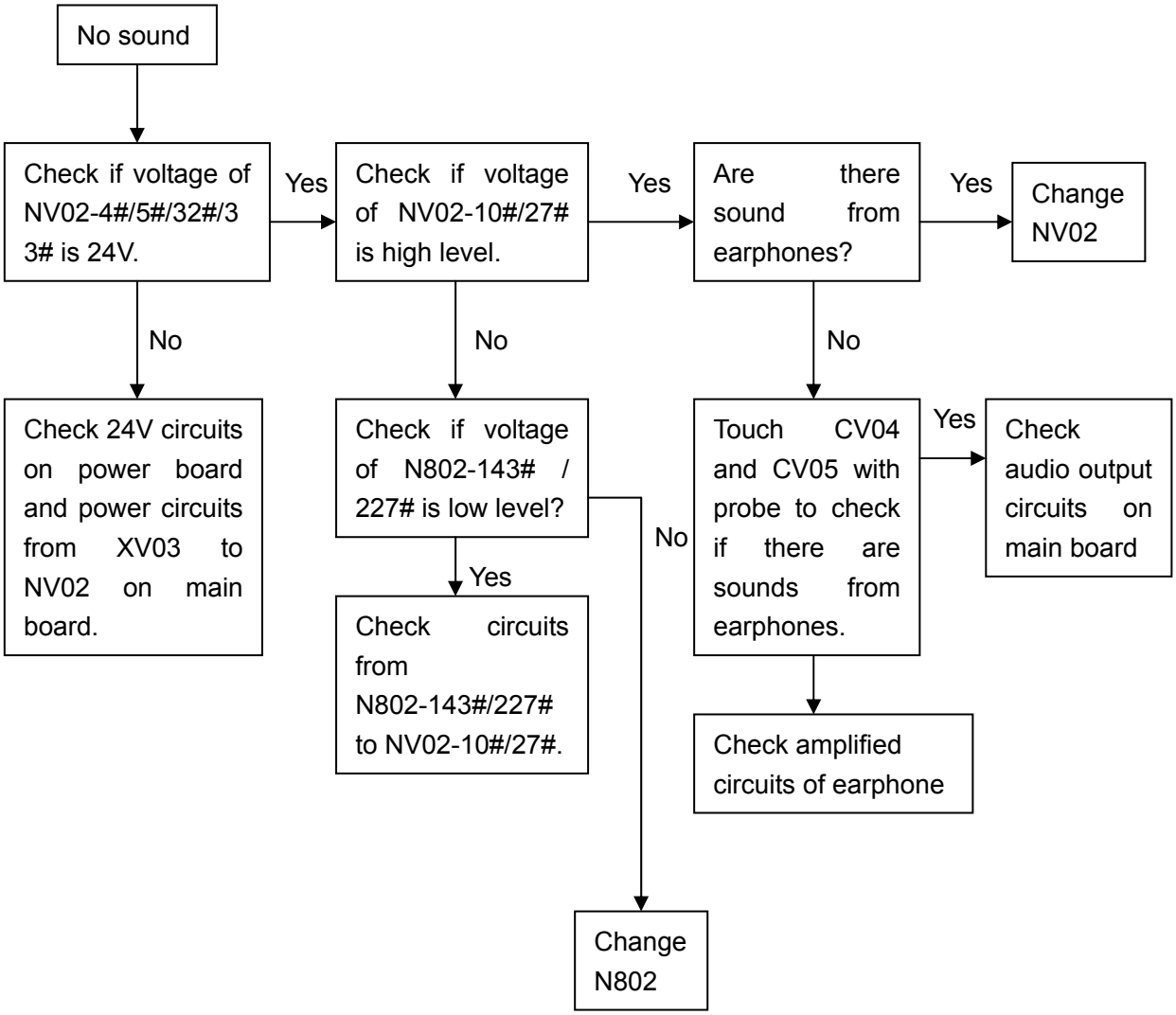
1. Panel doesn't light up.

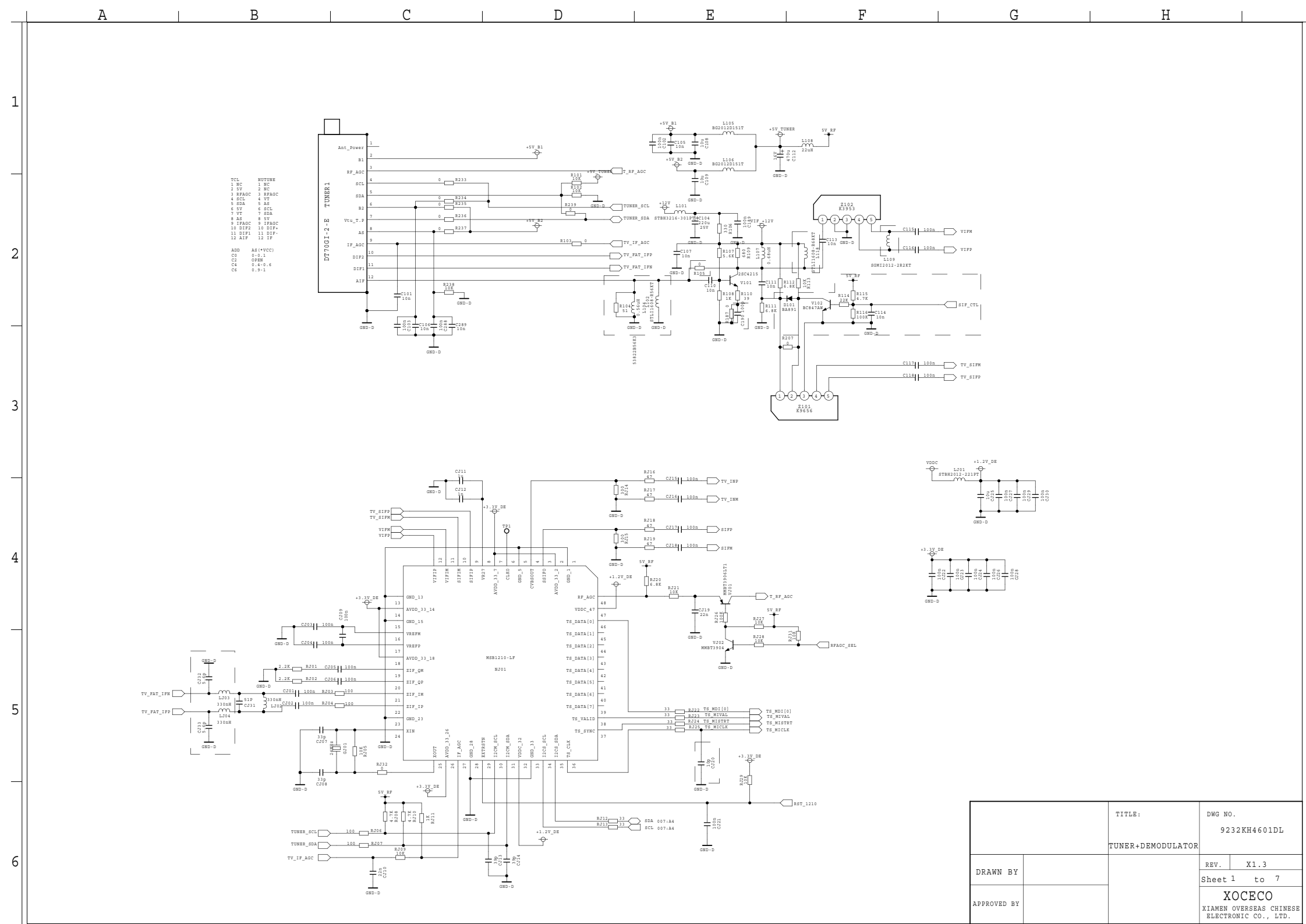

Switch on main power, check if red indicator lights up in STANDBY mode.
Yes
No
Press key "POWER" of remote control or the unit to turn on TV set, check indicator light.
Red
Blue
Check if voltage of X108-3# (STB) on main board is 5V.
No
Check STANDBY circuits on power board.
Check if voltage of X108-13# on main board is high level.
Yes
No
Check backlight circuits on power board and backlight board.
Check backlight control circuits N101 on main board.
Check if voltage of X108-1# on main board is high level.
Yes
Check power board.

2．Backlight is normal, but no picture.


Check if TV set can be operated by remote control or keys of the unit.
Yes
Press key “menu”, check if OSD display normally.
Yes
No
No
Aren’t there pictures of all channels?
Yes
No
Enter into factory menu, initialize EEPROM, power off and then power on TV set again, check if there is picture.
Change main board.
No
Yes
Change main board.
Readjust main board.

3．Picture is normal, but no sound.


No sound
Check if voltage of NV02-4#/5#/32#/33# is 24V.
Yes
Check if voltage of NV02-10#/27# is high level.
Yes
Are there sound from earphones?
Yes
Change NV02
No
Check 24V circuits on power board and power circuits from XV03 to NV02 on main board.
No
Check if voltage of N802-143# / 227# is low level?
Yes
Check circuits from N802-143#/227# to NV02-10#/27#.
No
Change N802
No
Touch CV04 and CV05 with probe to check if there are sounds from earphones.
Yes
Check audio output circuits on main board
Check amplified circuits of earphone


TUNER1
DT7001-2-E
Ant_Power
B1
RF_AGC
SCL
SDA
B2
Vtu_T.P
AS
IF_AGC
DIF2
DIF1
AIF
TCL NUTUNE
1 NC 1 NC
2 5V 2 NC
3 RFAGC 3 RFAGC
4 SCL 4 VT
5 SDA 5 AS
6 5V 6 SCL
7 VT 7 SDA
8 AS 8 5V
9 IFAGC 9 IFAGC
10 DIF2 10 DIF+
11 DIF1 11 DIF-
12 AIF 12 IF
ADD AS(*VCC)
C0 0-0.1
C2 OPEN
C4 0.4-0.6
C6 0.9-1
+5V_B1
+5V_B2
+5V_TUNER
+12V
5V_RF
+3.3V_DE
+1.2V_DE
GND-D
TUNER_SCL
TUNER_SDA
T_RF_AGC
TV_IF_AGC
TV_FAT_IFP
TV_FAT_IFN
VIFP
VIFM
SIF_CTL
TV_SIFM
TV_SIFP
RPAGC_SEL
TS_MDI[0]
TS_MIVAL
TS_MISTRT
TS_MICLK
RST_1210
SDA 007:A4
SCL 007:A4
TV_INP
TV_INM
SIFP
SIFM
MSB1210-LF
NJ01
Z102 K3953
Z101 K9656
L101 STBH3216-301PT
L105 BQ2012D151T
L106 BQ2012D151T
L108 22uH
L109 SGMI2012-2R2KT
V101 2SC4215
V102 BC847AW
VJ01 MMBT3906LT1
VJ02 MMBT3904
LJ01 STBH2012-221PT
LJ03 330nH
LJ04 330nH
TP1
TITLE:
TUNER+DEMODULATOR
DWG NO.
9232KH4601DL
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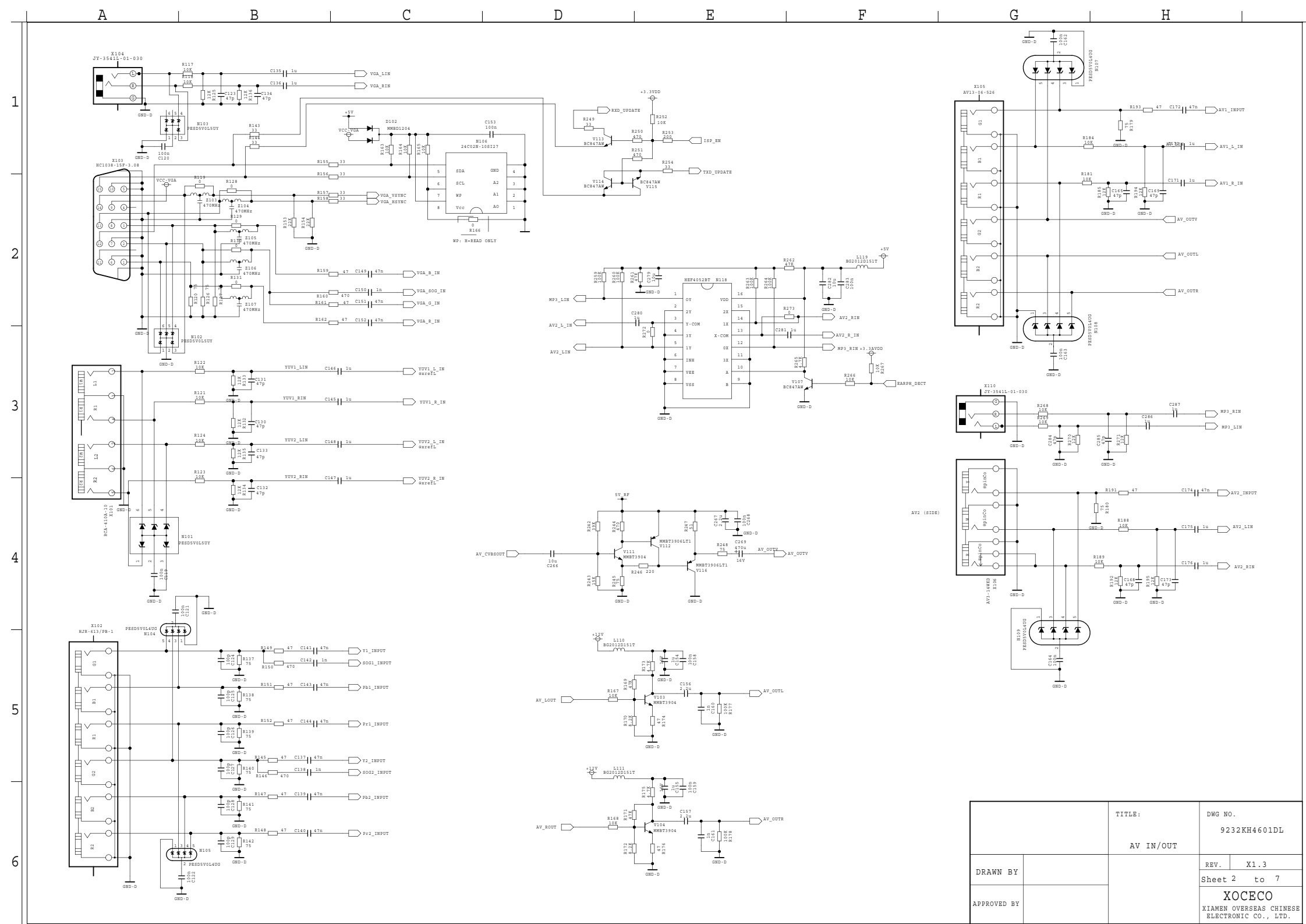
REV. X1.3
Sheet 1 to 7
XOCECO
XIAMEN OVERSEAS CHINESE ELECTRONIC CO., LTD.



	TITLE: AV IN/OUT	DWG NO. 9232KH4601DL	
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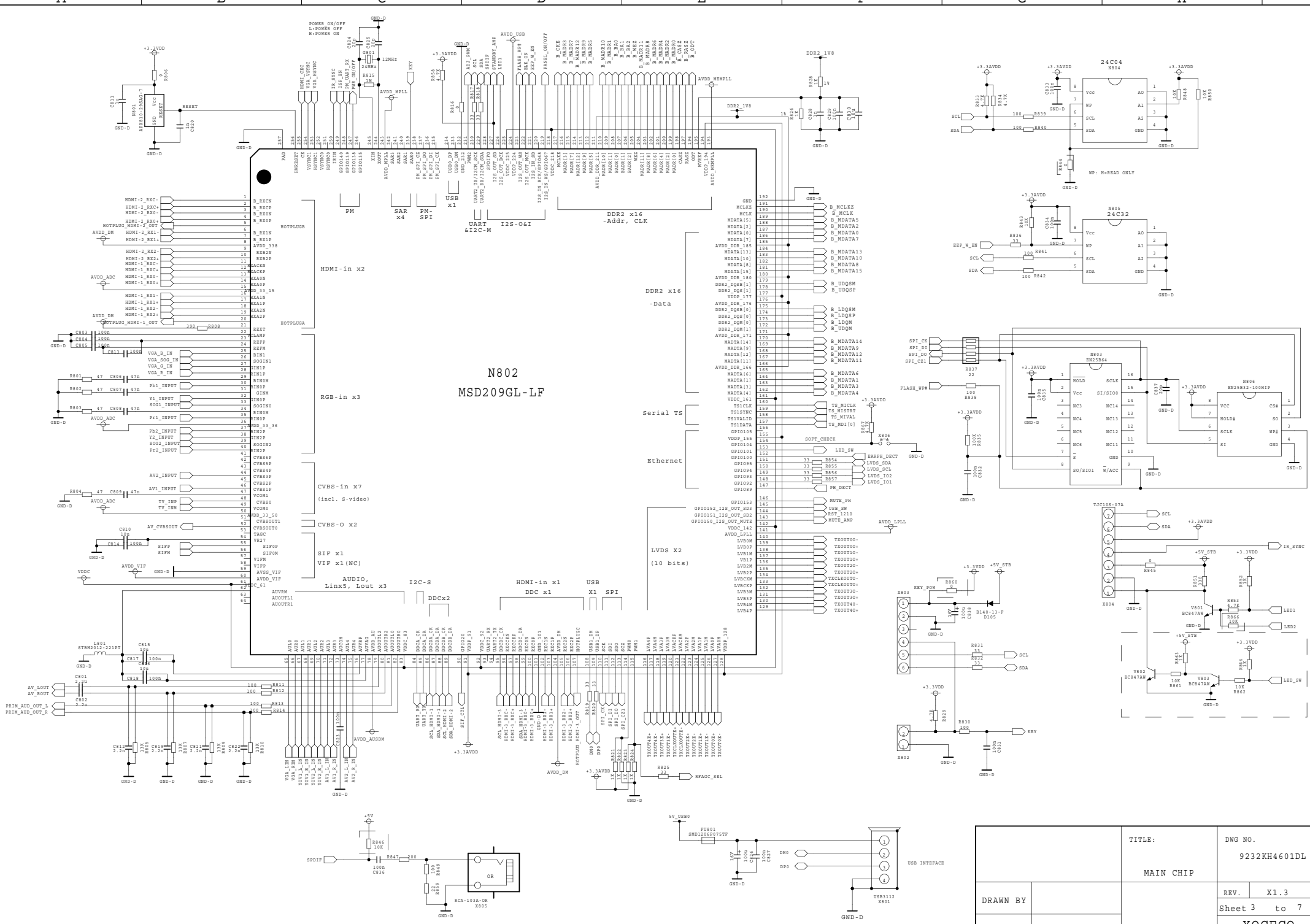
		XOCECO XIAMEN OVERSEAS CHINESE ELECTRONIC CO., LTD.	



		TITLE: MAIN CHIP	DWG NO. 9232KH4601DL
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APPROVED BY			Sheet 3 to 7
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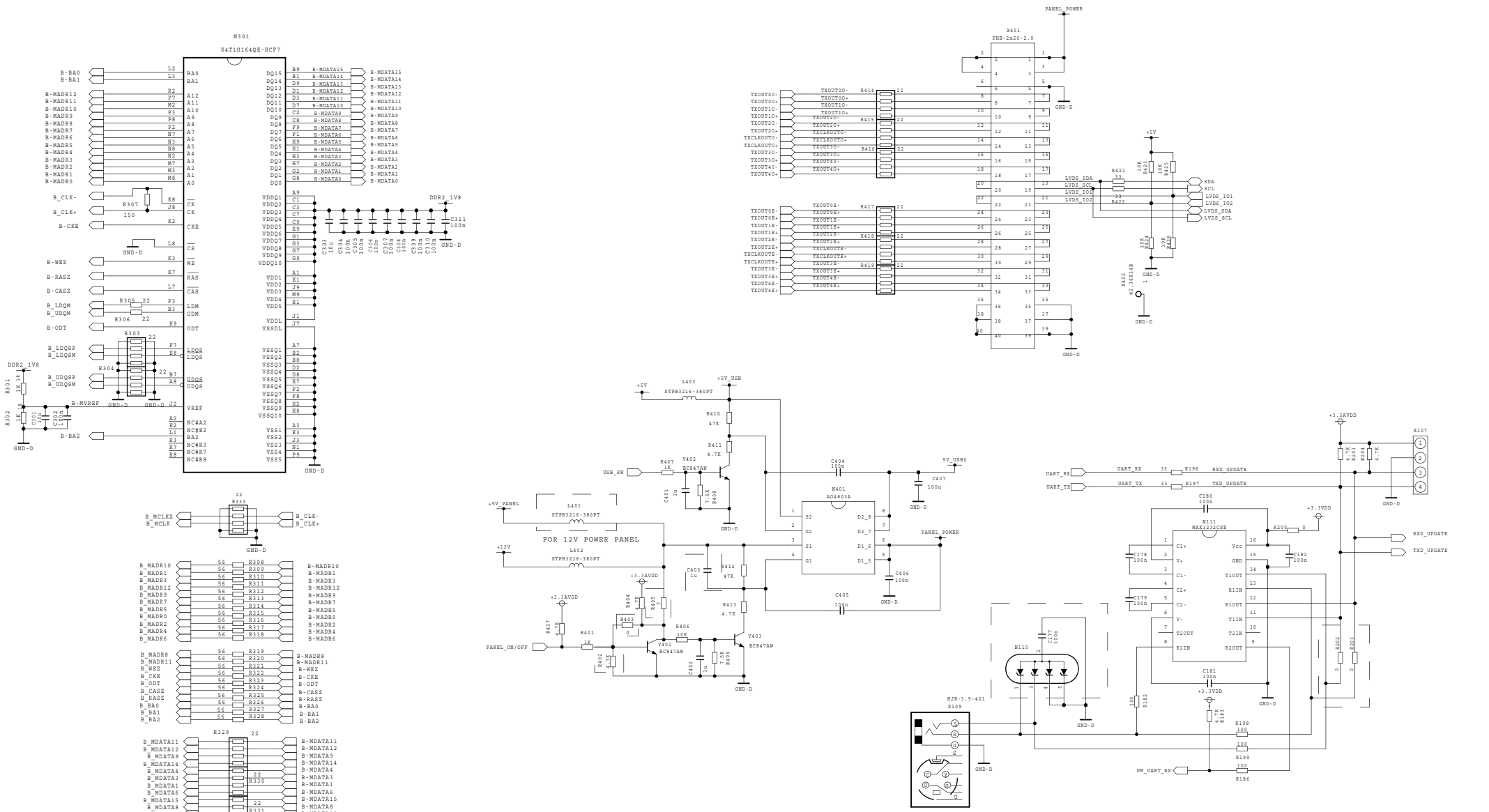

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APPROVED BY		Sheet 4 to 7
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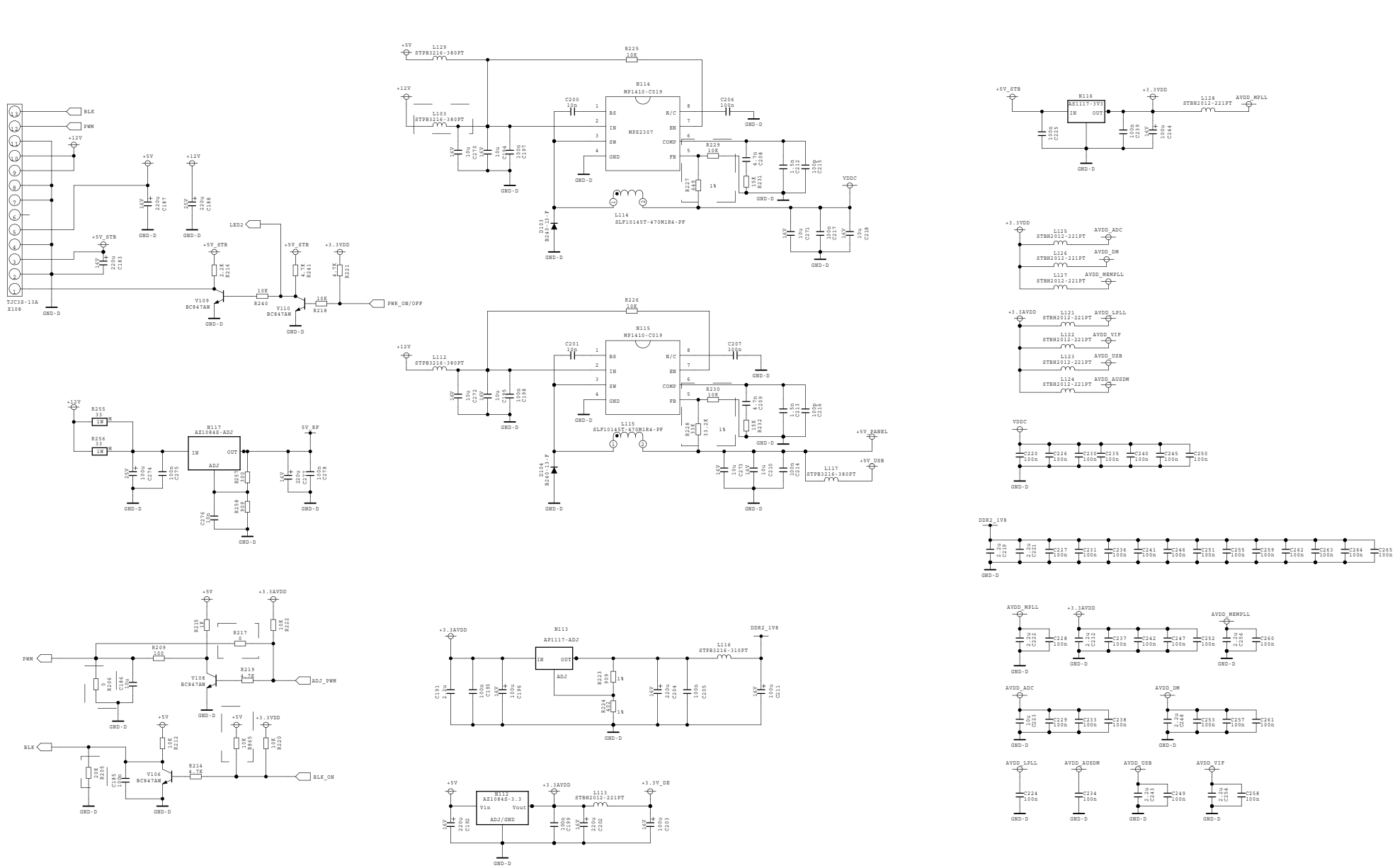

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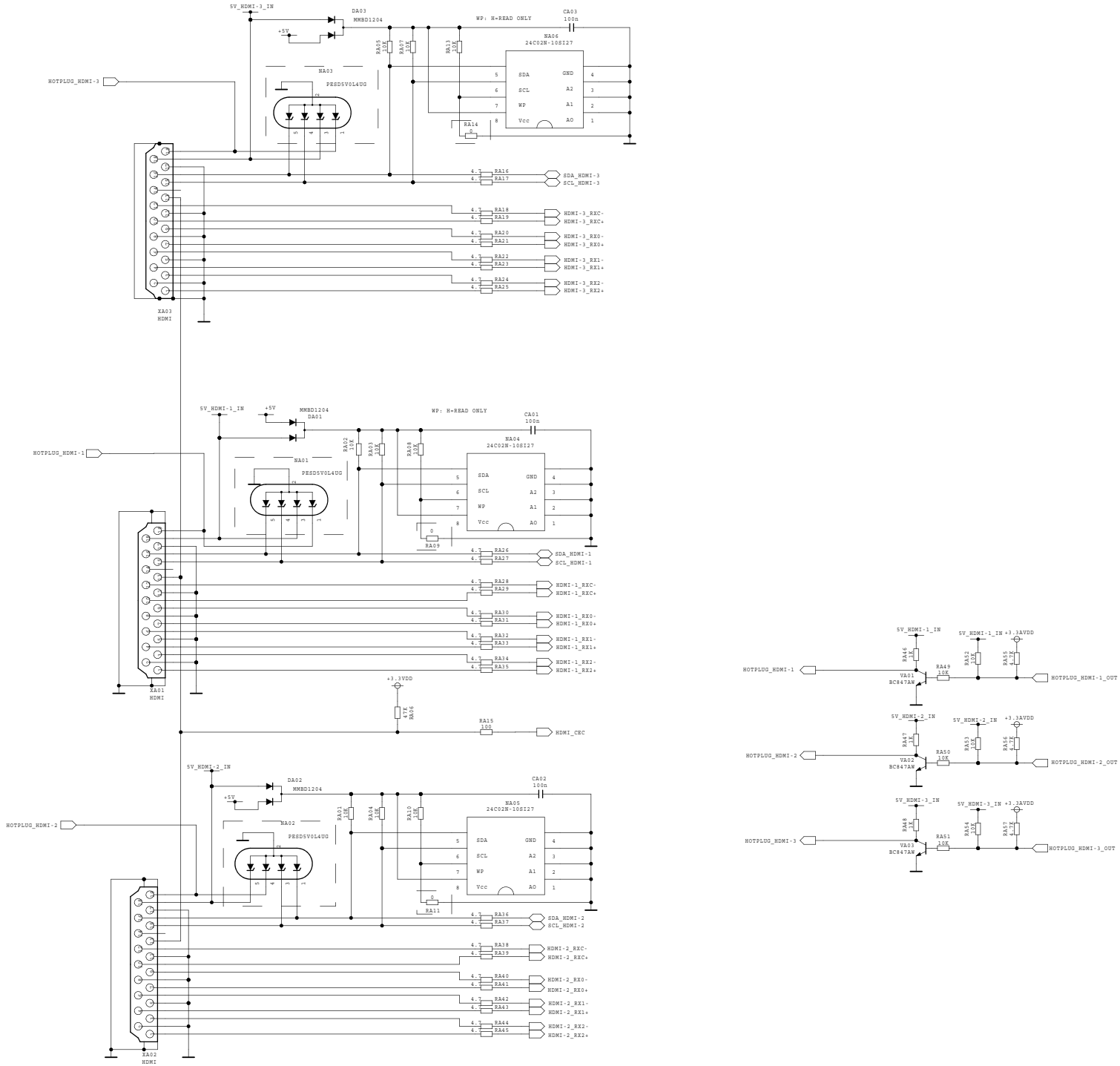
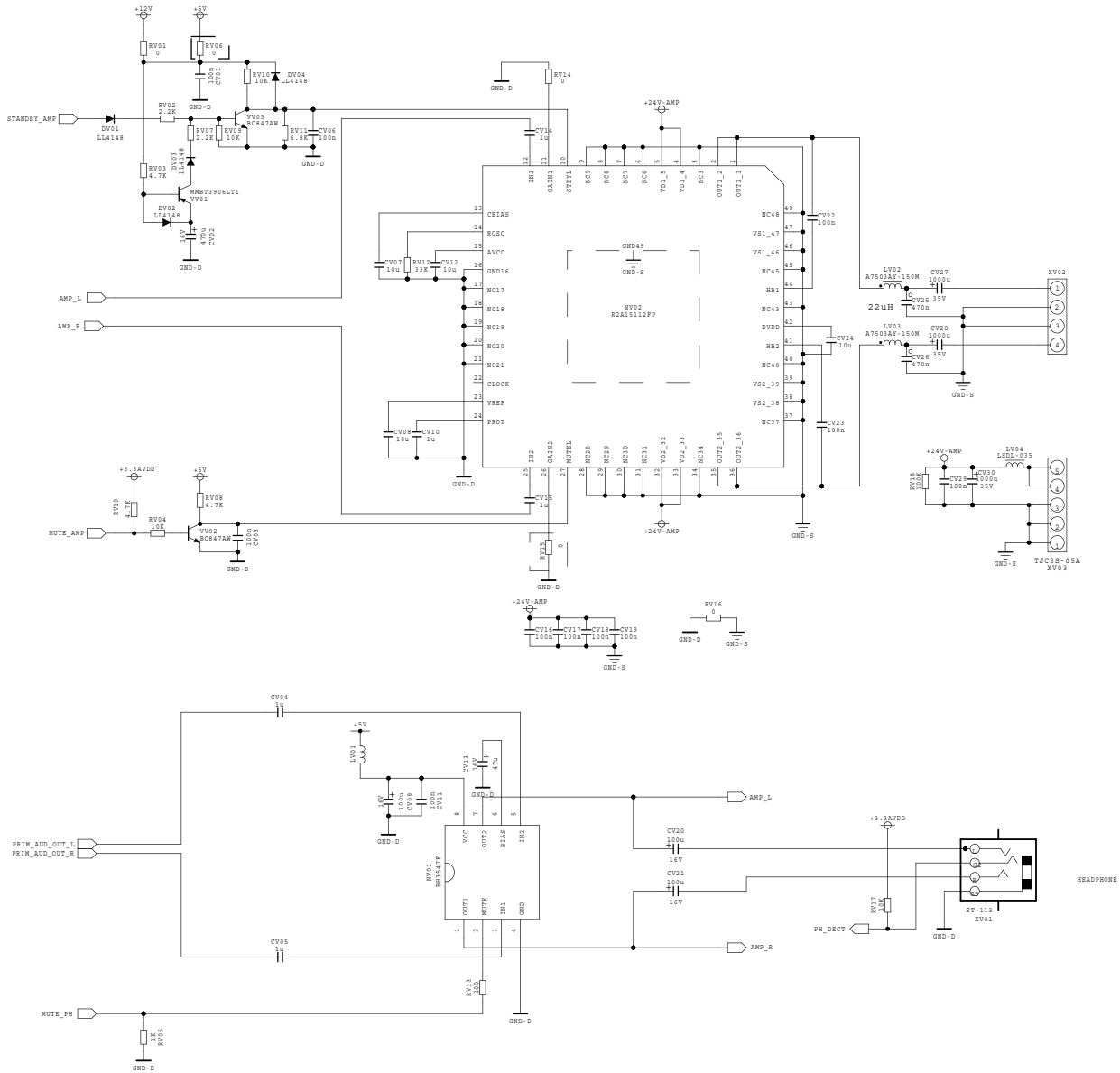
APPROVED BY			Sheet 5 to 7
			XOCECO XIAMEN OVERSEAS CHINESE ELECTRONIC CO., LTD.



		TITLE: HDMI	DWG NO. 9232KH4601DL
DRAWN BY			REV. X1.3
APPROVED BY			Sheet 6 to 7
			XOCECO XIAMEN OVERSEAS CHINESE ELECTRONIC CO., LTD.



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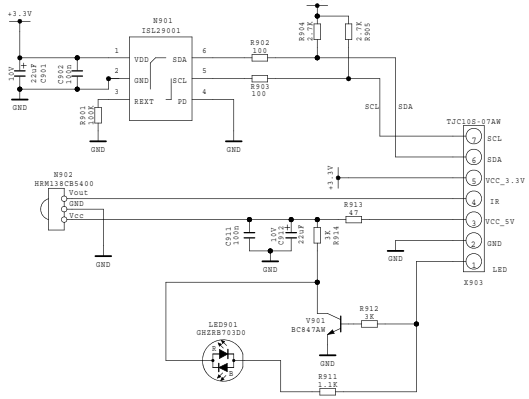
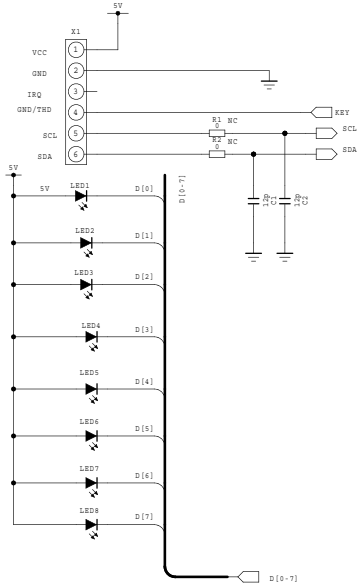
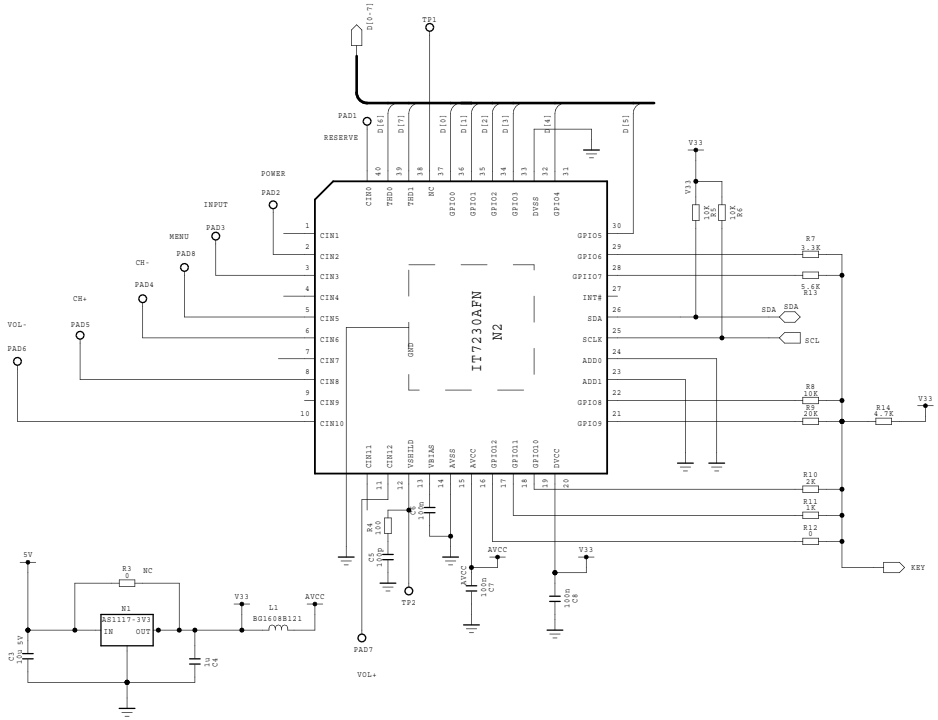
DRAWN BY			REV. X1.3
APPROVED BY			Sheet 7 to 7
			XOCECO XIAMEN OVERSEAS CHINESE ELECTRONIC CO., LTD.

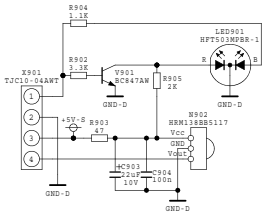


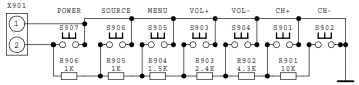




FOR XXKH52

FOR XXKH46





IR

KEY

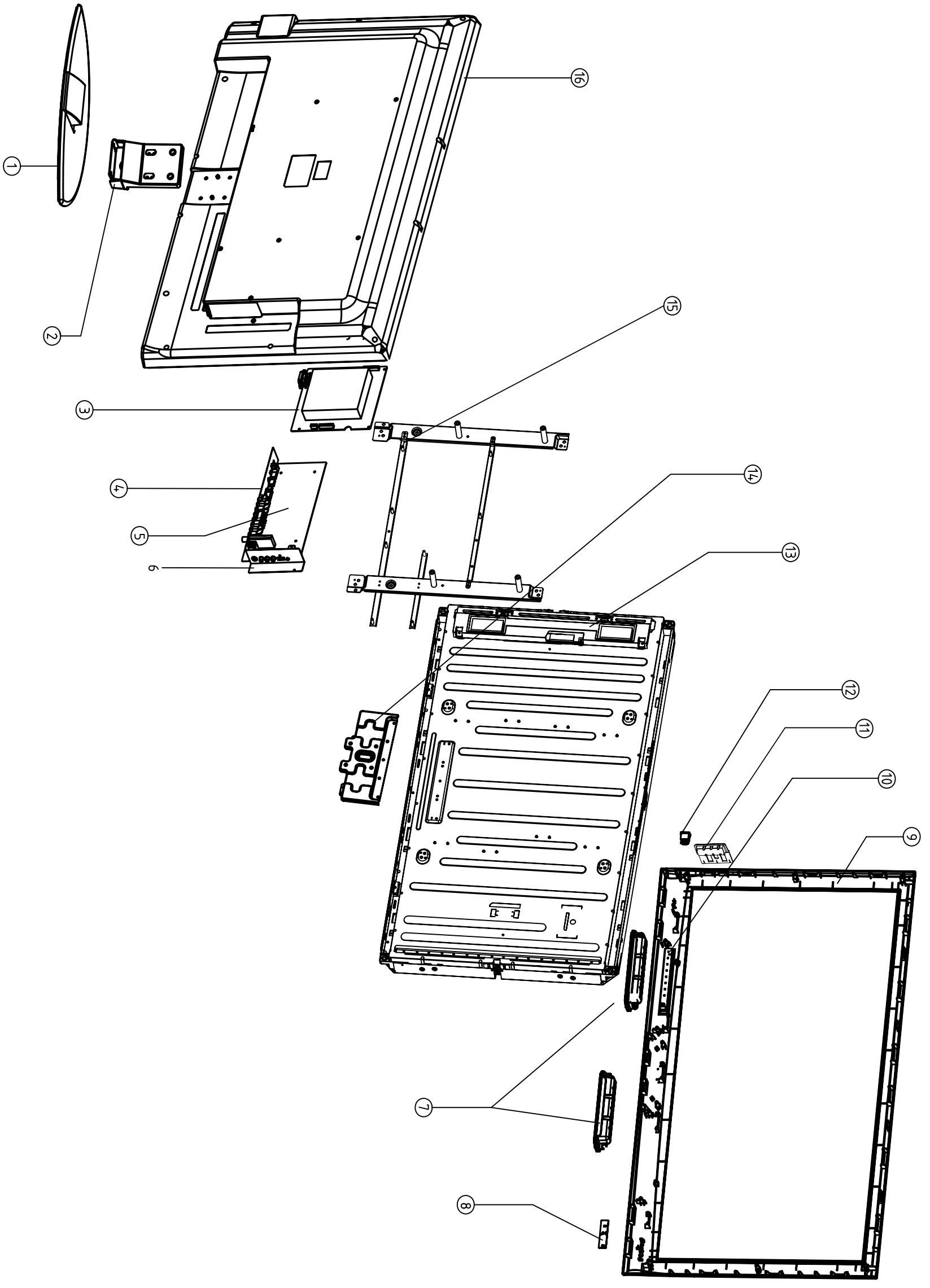
	TITLE: IR + TOUCH KEY	DWG NO. 9232KH4601DL	
DRAWN BY		REV. A1.0	
APPROVED BY		Sheet 8 to 9	
		XOCECO XIAMEN OVERSEAS CHINESE ELECTRONIC CO., LTD.	

		名称	编号
		Power	
版 次	更改单号		版次
更改记录			第 页 共 页
拟 制			
审 核			
标准化			厦门华侨电子股份有限公司
工 艺			
批 准			

APPENDIX-A: Main assembly 9240KH5215 LCD-40XR10F(D)

NAME	NO.	MAIN COMPONENT AND IT'S NO.	
Main board	XI6KH00701C0	N802 N301 NJ01 TUNER1 NV02	MSD209GL (5270209002) K4T1G164QE-HCF7(5270164002) MSB1210-LF (5271210001) FT2119 (5524050026) R2A15112FP (5271511201)
IR board	XI635KH00204		
Key board	XI635KH00202		
Power board	XI6KH00720A0		
Remote control	XI6010900502	RC-905-0A	
Panel	XI5203408104	LTA400HM09	

APPENDIX-B: Exploded view (LCD-40XR10F(D))



PART LIST OF EXPLODED VIEW

REF.No.	DESCRIPION
1	Pedestal assembly
2	Standing pole assembly
3	Power board assembly
4	Interface baffle (below)
5	Main board assembly
6	Interface baffle (right)
7	Sound box assembly
8	IR assembly
9	Front cabinet assembly
10	Touch key assembly
11	Key bracket
12	Power switch
13	Display panel
14	Pedestal bracket
15	Panel holder assembly
16	Back cover assembly

Note: design and specification are subject to change without notice.

PART LIST

LCD-40XR10F(D) ver.1.0

REF.No.	PARTS No.	DESCRIPION	Q'TY	REMARK
1	XI6151225010	Pedestal assembly	1	
2	XI6156110000	Standing pole assembly	1	
3	XI6KH00720A0	Power board assembly	1	
4	XI5810D72200	Interface baffle (below)	1	
5	XI6KH00701C0	Main board assembly	1	
6	XI5810C72110	Interface baffle (right)	1	
7	XI617083400A	Sound box assembly	1	
8	XI635KH00204	IR assembly	1	
9	XI6640520180	Front cabinet assembly	1	
10	XI635KH00202	Touch key assembly	1	
11	XI58B0A45810	Key bracket	1	
12	XI5293000060	Power switch	1	
13	XI5203408104	Display panel	1	LTA400HM09
14	XI5810079800	Pedestal bracket	1	
15	XI6153372000	Panel holder assembly	1	
16	XI674052J150	Back cover assembly	1	
17	XI6010900502	Remote control	1	
18	XI5944039140	User manual	1	
19	XI60Z0000760	Backlight board	1	
20	XI60Z0000761	Logical board	1	

- Only the parts in above list are used for repairing.
- Other parts except the above parts can't be supplied.

Assemble & Disassemble the Pedestal Base (Option)

If the stand is provided, please read these instructions thoroughly before attempting this installation.

You must install your TV into the stand in order for it to stand upright on a cabinet or other flat surface. If you intend to mount your TV on a wall or other vertical surface, you must remove the stand column.

Cautions:

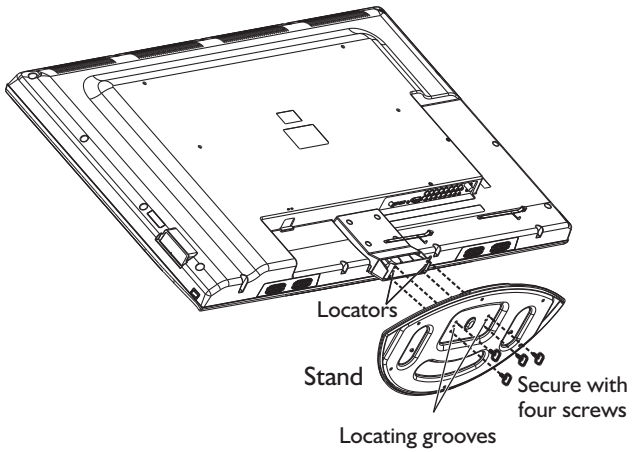
Make sure that you handle your TV very carefully when attempting assembly or removal of the stand. If you are not sure of your ability to do this, or of your ability to use the tools necessary to complete this job, refer to a professional installer or service personnel. The manufacturer is not responsible for any damages or injuries that occur due to mishandling or improper assembly.

When using a table or bench as an aid to assembly, make sure that you put down a soft cushion or covering to prevent accidental scratching or damage to your TV's finish.

The speaker is not intended to support the weight of your TV. Do not move or handle your TV by the speaker. This can cause damage to your TV that is not covered by the manufacturer's warranty.

Before attempting assembly or removal of the stand, unplug the AC power cord.

Installing the stand



To install the stand:

1. Remove the stand from the box and place it on a table or bench.

   You must pay attention to the direction of the stand. The wide portion of the stand should go towards the front of the TV.

2. Lay your TV flat (screen down) on the edge of a table or bench. Make sure that you put down a soft cushion or cloth so that your TV is not scratched.

3. Put the stand close to the TV back, align the stand with the TV by moving the stand steadily until the Stand Locators align with the locating grooves on the stand. And align the screw holes on the TV back with the holes in the stand, then secure the stand to the TV with provided screws .

To remove the stand from the TV, perform these steps in reverse order.

NOTE:

The appearance of this product in these illustrations may differ from your actual product, and is for comparative purposes only.

WALL MOUNTING INSTRUCTIONS

Safety Precautions:

1. Be sure to ask an authorized service personnel to carry out setup.
2. Thoroughly read this instruction before setup and follow the steps below precisely.
3. The wall to be mounted should be made from solid materials. Only use accessories supplied by the manufacturer.
4. Very carefully handle the unit during setup. We are not liable for any damage or injury caused by mishandling or improper installation.
5. Be sure to place the unit on a stable and soft platform which is strong enough to support the unit.
6. Do not uplift the speaker when moving the display. The appearance of the unit may different from the actual ones.
7. Design and specifications are subject to change without notice.
8. Retain these instructions for future reference.

Note: All the wall mounting parts are optional and may be unavailable in your model.

Below we will show you how to mount the Display on the wall using our company's wall mounting components.

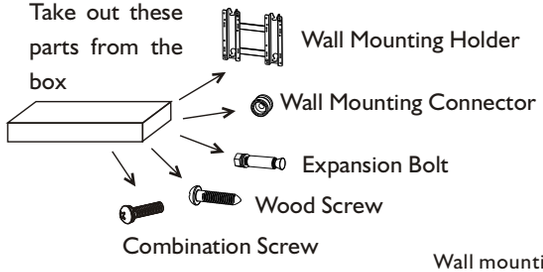


Fig.1

1. There are three options of wall mounting holder with different specifications :200200,200400,200600. Please check your wall mounting holder for its specification.

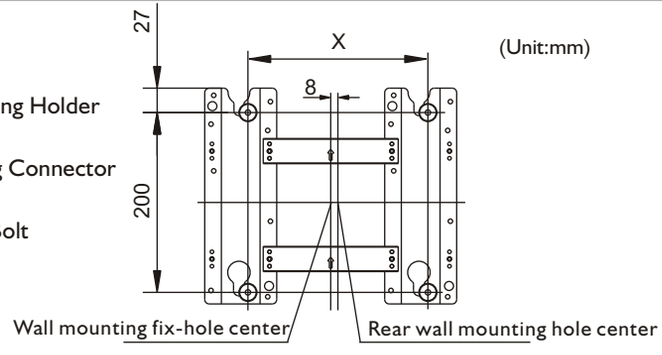


Fig.2

2. Due to the wall mounting fix-groove leaning to the right side, the whole unit will lean to right side after installation, please carefully measure the position of the holes you want to drill, refer to the parameters on Fig.2 when drilling the holes.

Note: The "X" in Fig.2 represents a data. It may be 200mm or 400mm or 600mm.

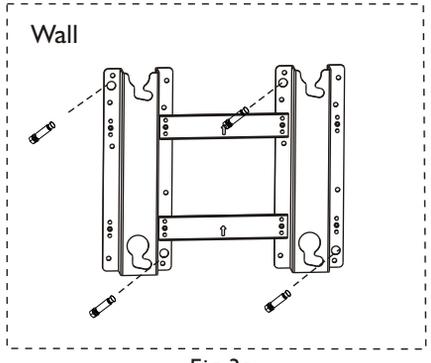


Fig.3a

3a. Screw 4pcs expansion bolts to fix the wall mounting holder on the wall.

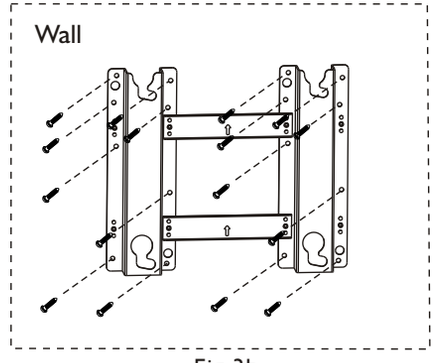


Fig.3b

3b. If your wall is a wooden structure, please fix the wall mounting holder on the wall with 16pcs wood screws.

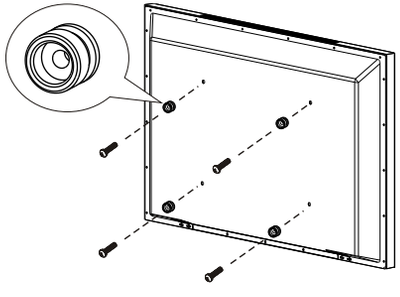


Fig.4

4. Use the 4pcs combination screws to fix the wall mounting connector to the rear of the display unit.(Caution:the direction of the connectors should be strictly confirm to the diagram illustrated above).

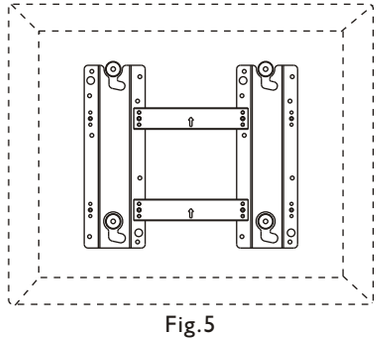


Fig.5

5. Put the back of the display unit close to the wall mounting holder, insert the four wall mounting connectors into the four calabash-shaped holes on the wall mounting holder. (Fig.5)

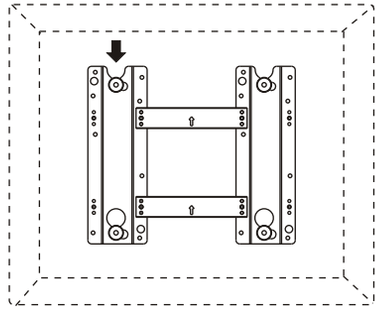


Fig.6

6. Let the display unit slowly slide down to the end of the calabash-shaped hole. (Fig.6)

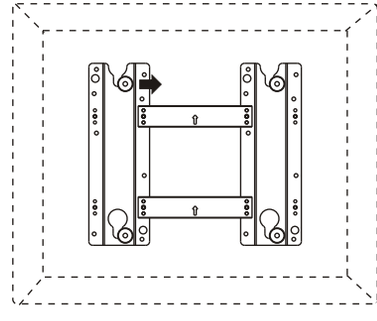


Fig.7

7. Push rightwards carefully until the wall mounting connectors fully slide into the right fix-grooves and be sure the mounting is secure.

8. If you want to dismount the unit do the above steps in reverse order.

May 2011

SANYO Electric Co., Ltd.